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Cotton in Turkey

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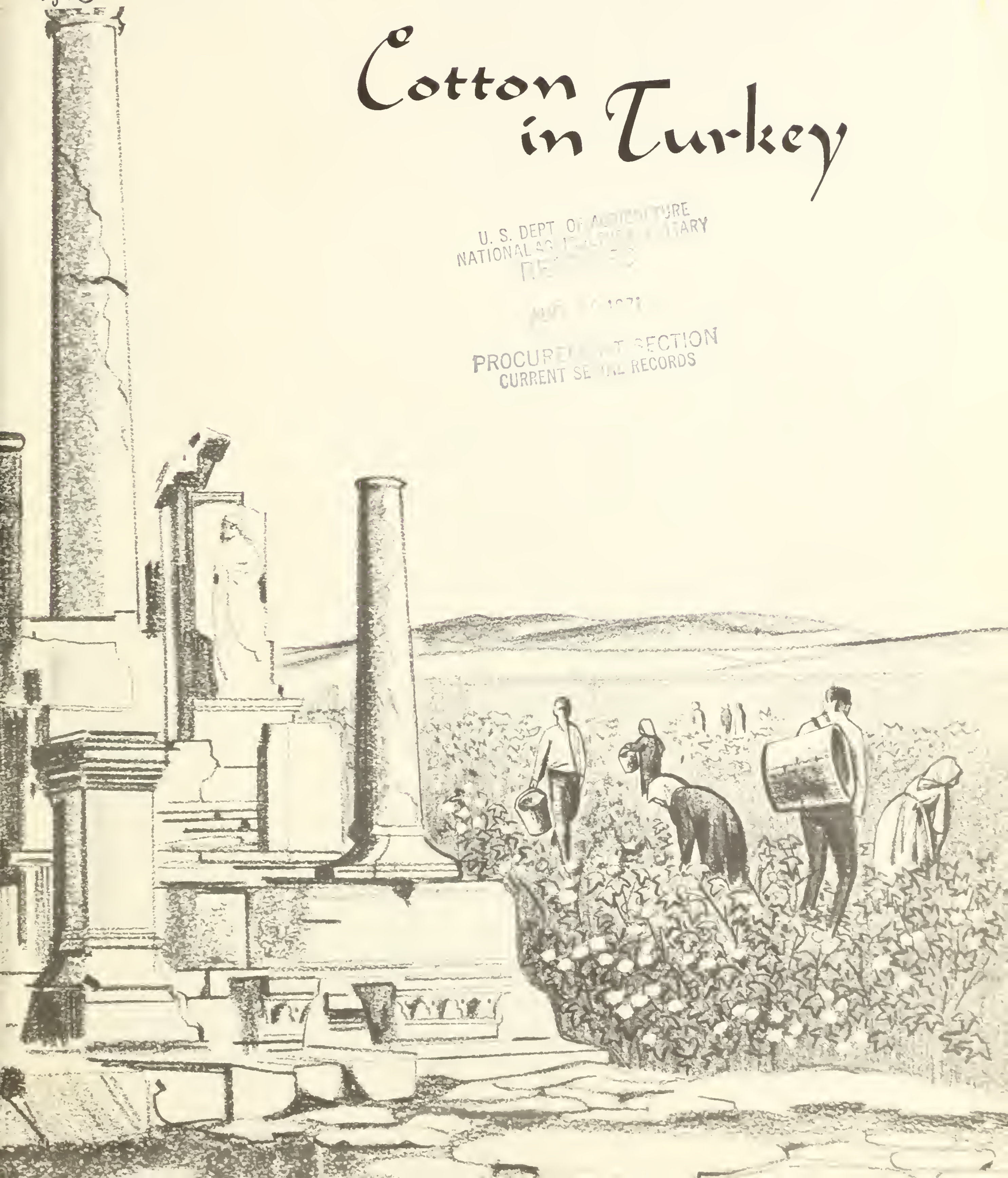

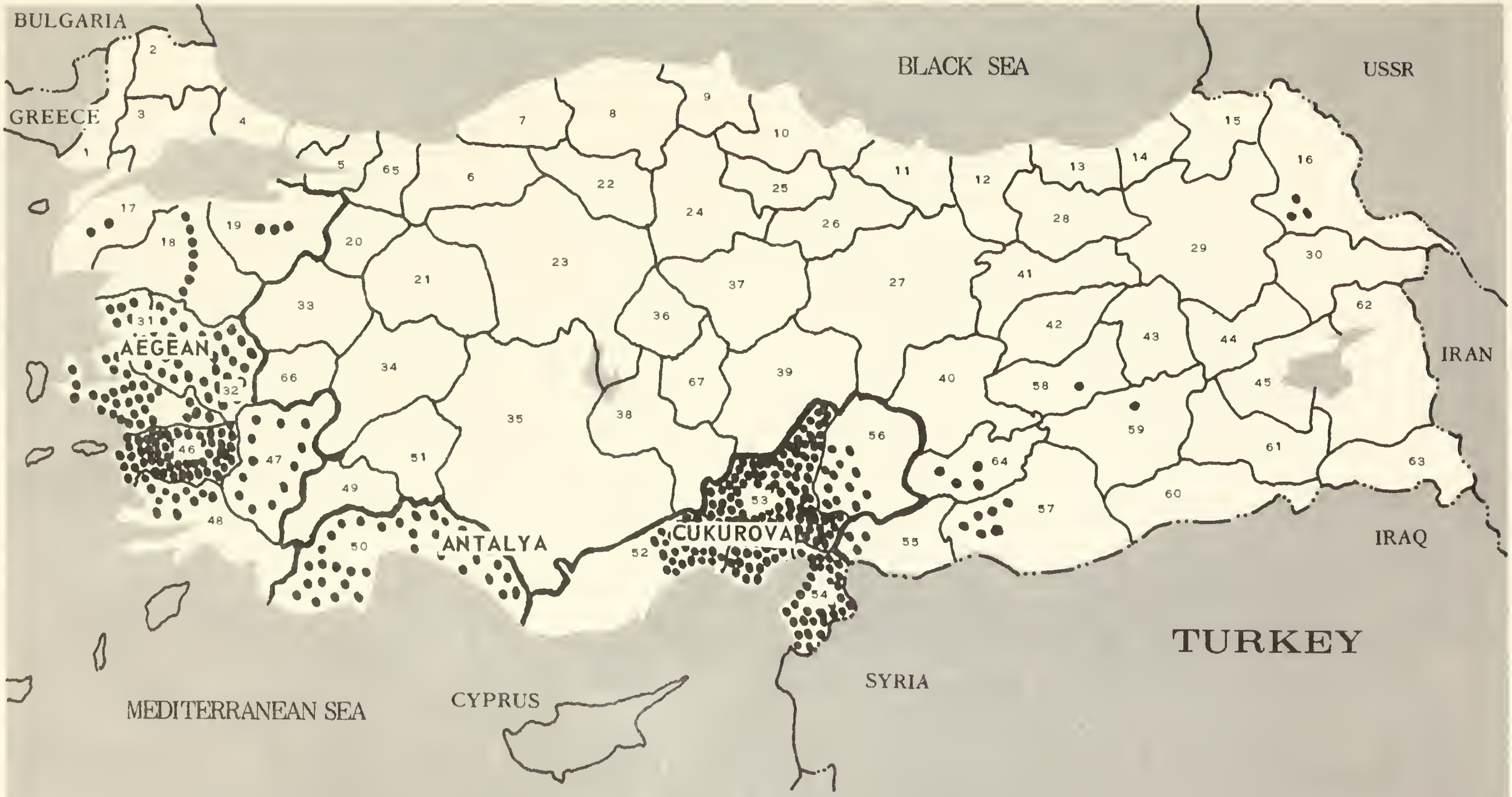

COTTON PRODUCTION BY PROVINCE AND REGION:

each dot represents 5,000 bales

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3. TEKIRDAG
4. ISTANBUL
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FOREWORD

Turkish exports of cotton have increased rapidly in recent years to more than a million bales annually, making Turkey a major U.S. competitor in the important West European and Japanese cotton import markets. In fact, Turkish exports of cotton to Western Europe in 1969-70 were more than triple such exports from the United States.

This study is another in a series of reports on agricultural developments in countries that are major competitors of the U.S. raw cotton industry. It is intended to inform U.S. cotton interests of developments that affect prospective exports of U.S. cotton

The authors take this opportunity to express their sincere appreciation to each person who contributed information and comments for this study, including Turkish Government officials concerned with cotton and Turkish farm, industry, and trade representatives. They also wish to thank the Agricultural Attaché, his assistants, and other members of the American Embassy in Ankara and officials of the American Consulate Generals in Adana and Izmir for their contributions.

H. Reiter Webb, Jr.
Director, Cotton Division

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Cotton in Turkey

By Robert B. Evans and Horace G. Porter
Cotton Division

SUMMARY AND CONCLUSIONS

Turkey, the world's sixth largest exporter of cotton, has seen dramatic growth in its cotton trade during a period when U.S. exports have declined. Between 1955-59 and 1960-64 Turkish cotton exports doubled to 534,000 bales, only to double again by 1965-69 to an average of 1,020,000 and to rise still further, to 1,138,000 bales, in 1969-70—a figure expected to be equaled again this season. The result is that today cotton is Turkey's most valuable export, earning over $100 million annually in foreign exchange and accounting for a fifth of the total value of all Turkish exports. Western Europe is the most important market, but in the last few years, Eastern Europe, Lebanon, and Japan have also become major purchasers.

Turkish cotton is almost entirely 1-1/32" - 1-3/32" in staple length, as is 70 percent of the cotton grown in the United States. Cotton currently costs around 24 cents per pound to produce in Turkey at average yields under irrigation, including 7 cents for land and overhead. With high yields, costs can fall to as low as 17 cents, including 5 cents for land and overhead. In the last few years, Turkish cotton generally has sold on world markets at prices ranging from 1 to 2 cents per pound below U.S. cotton although there have been times when U.S. cotton was fully competitive.

Despite success in the export market, Turkish cotton in recent years has come up against heavy competition at home from other crops—Mexican wheat in particular. Introduced to Turkey in 1967, this high-yielding wheat siphoned off large areas of cotton land during the late 1960s, contributing to a 25-percent drop in cotton area between the peak year 1967-68 and 1970-71. Most of the decline was on nonirrigated tracts, where net returns from cotton were disappointing and often below returns obtainable from Mexican wheat.

The drift away from cotton may prove to be short-lived, however, as a consequence of a number of factors. One of these is less favorable results than expected from large plantings of Mexican wheat. Another is the considerable rise in cotton prices in Turkish lira following devaluation in August 1970. Before that time cotton exports earned 9.00 lira to the dollar plus a 10 percent tax rebate. Since then the applicable exchange rate has been a flat 12.00 lira to the dollar with the possibility of a further rise to 15.00 in the future if it is felt that the cotton situation warrants it.

These factors have stimulated cotton planting sufficiently to bring a rebound in 1971-72 production, given normal weather. Current prospects are for a crop in the neighborhood of the 2.0 million-bale peak achieved in 1968-69, compared with 1.8 million produced in 1970-71.

Over the longer term, it is likely that a crop rotation involving cotton, Mexican wheat, and other crops may replace the present largely cotton monoculture. And it is unlikely, considering cotton price and cost trends and the availability of Mexican wheat, that nonirrigated cotton will make much of a comeback. In fact, Turkish Government plans call for a phasing out of such cotton. Turkey's irrigated area is gradually increasing and with it additional land will become available for cotton. Cotton gains, however, will probably be restricted by competition from fruits, vegetables, Mexican wheat, and other crops.

Cotton yields have risen sharply in recent years, owing to increased irrigation, the introduction of higher-yielding and earlier maturing varieties and better production practices. Yields should continue to rise in the years ahead, but considering what already has been accomplished, the rate of gain may be considerably less than in the last few years.

While the largest share of Turkey's raw cotton production is exported, home use has also been growing and now stands at around 800,000 bales annually, compared with 500,000 in 1962. The number of cotton-spinning spindles in the Turkish industry increased from 1,053,000 in 1967 to 1,545,000 in 1969. The per capita level of consumption of all apparel fibers is 15.0 pounds, compared with a world average of 13.2 and a West European average of 24.0.

Cotton is the dominant textile fiber used in Turkey, accounting for three-fourths of the total consumption of apparel fibers, but production and use of manmade fibers is rising.

Turkish exports of cotton textiles have been small thus far, but they are likely to rise now that the Turkish Government is giving them the benefit of the full exchange rate of 15.00 lira to the dollar plus a tax rebate of 30 to 35 percent. Textile exports may also benefit from Turkey's association with the European Community. Such exports in the future could adversely affect West European mill consumption of U.S. and other raw cottons.

Considering both rising domestic demand for textiles and the likelihood of increased textile exports, it is likely that in the years ahead a larger and larger proportion of Turkey's cotton production will be processed at home.

Turkey, like the United States, is a member of the International Cotton Advisory Committee, the intergovernmental commodity group established to bring together statistics on cotton and to promote cooperation in the solution of cotton problems. The country is not yet a member of the International Institute for Cotton, to which a number of cotton-exporting countries are contributing a dollar a bale on exports to Western Europe and Japan to promote the use of cotton in these important markets.

THE CHANGING PRODUCTION PICTURE

Cotton's place in the economy

Turkey's economy rests heavily upon agriculture, which contributes one-third of the domestic income and employs 72 percent of the labor force.

Most of Turkey is unsuited, climatically speaking, for a subtropical crop like cotton, and cotton occupies only around 1 percent of Turkey's total cultivated acreage. For Turkey as a whole, wheat and other grains are by far the leading crops; and vineyards, fruit trees, and olive groves each occupy a greater acreage than cotton (see Appendix Table 1). Nevertheless, cotton is a highly important cash crop in the areas where it is grown, principally along the Aegean and Mediterranean coasts, and Turkey in 1970-71 ranks as the world's eighth largest producer of cotton after the USSR, the United States, Mainland China, India, Pakistan, Brazil, and the UAR.

Cotton picking time in Cukurova region.

Around 800,000 bales (480 lb. net) of Turkey's cotton crop now goes to the country's expanding textile industry and, in the form of textiles, supplies three-fourths of Turkey's textile needs. Most Turkish cotton, however, is exported, and in 1963 cotton replaced tobacco as Turkey's leading export. Cotton exports in 1969 were valued at $113.6 million—down from the peak of $139.1 million in 1968, but still 30 percent of Turkey's total agricultural export, and 21 percent of all exports. In comparison, filbert exports in 1969 were valued at $107.6 million; tobacco, at $81.5 million; and all industrial products, at $134.8 million.

Trends in acreage, yield, and production

Turkey's cotton production averaged about 150,000 bales immediately preceding, during, and immediately after World War II, with little of this exported. From 1948 until 1952, however, cotton acreage rose dramatically from 734,000 acres to 1,669,000, and production, from 308,000 bales to 690,000. Turkey became an important factor in the world cotton export market beginning in about 1952-53, when 433,000 bales were exported.

Cotton area, yield, and production in Turkey

Year beginning August 1	Area	Yield	Production
Average:	*1,000 acres*	*Lb. per acre*	*1,000 bales*[1]
1925-29. . . .	369	115	88
1930-34. . . .	469	115	112
1935-39. . . .	667	179	249
1940-44. . . .	736	157	241
1945-49. . . .	644	200	268
1950-54. . . .	1,458	205	624
1955-59. . . .	1,553	227	734
Average—Cont.	*1,000 acres*	*Lb. per acre*	*1,000 bales*[1]
1960-64. . . .	1,600	327	1,091
1965-69. . . .	1,712	495	1,765
Annual:			
1967.	1,773	487	1,800
1968.	1,760	545	2,000
1969.	1,575	559	1,835
1970.	1,304	676	1,837

[1] Bales of 480 pounds net.

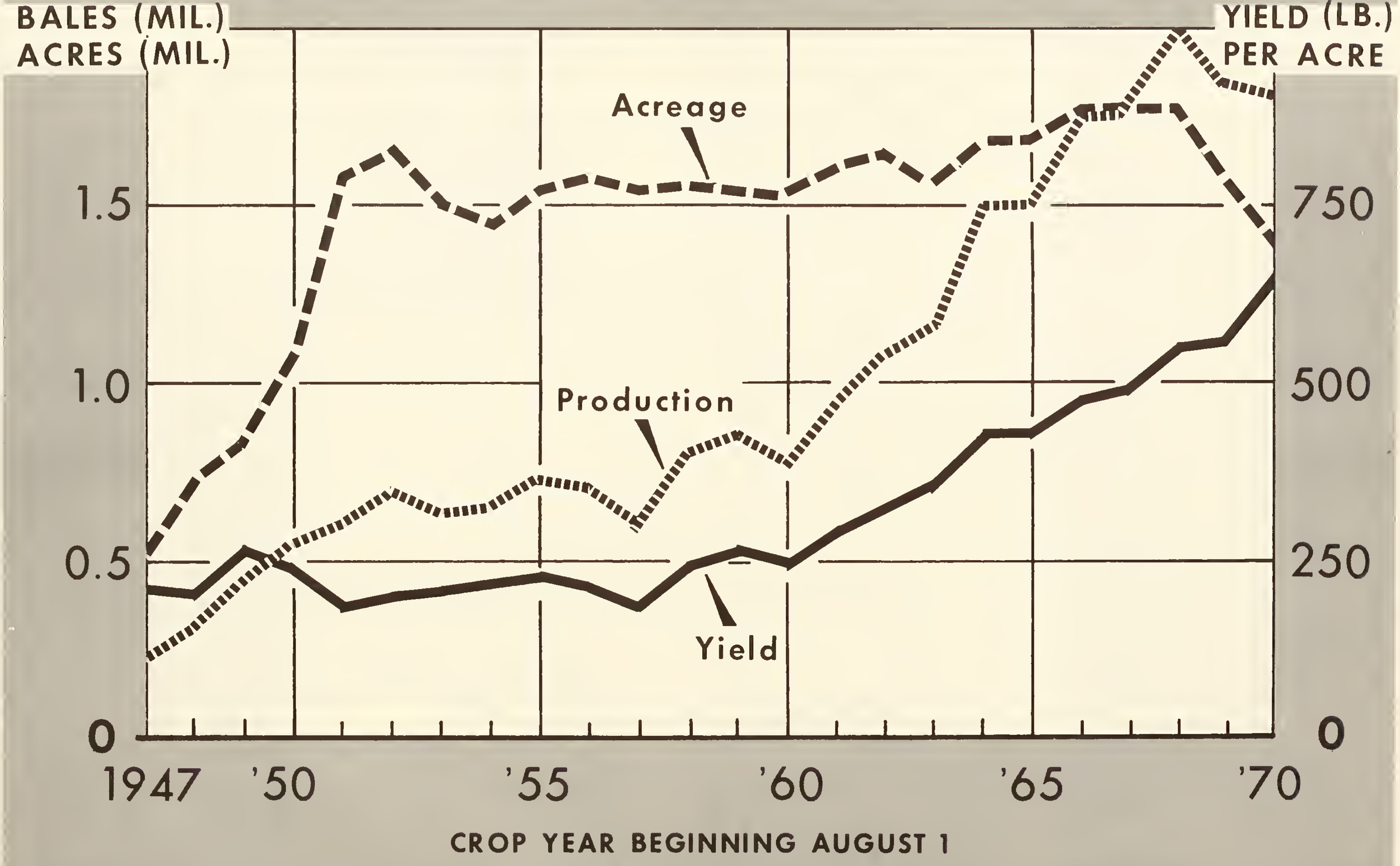
Turkey's supply and distribution of cotton

Year beginning August 1	Beginning stocks	Production	Imports	Total supply	Consumption	Destroyed	Exports	Ending stocks
	1,000 bales[1]	*1,000 bales*[1]	*1,000 bales*[1]	*1,000 bales*[1]	*1,000 bales*[1]	*1,000 bales*[1]	*1,000 bales*[1]	*1,000 bales*[1]
1950	43	542	–	585	210	13	349	13
1951	13	600	–	613	250	14	261	88
1952	88	690	–	778	260	7	433	78
1953	78	638	–	716	295	10	377	34
1954	34	650	–	684	380	6	233	65
1955	65	720	–	785	460	3	142	180
1956	180	700	–	880	480	1	224	175
1957	175	600	–	775	500	5	130	140
1958	140	800	–	940	480	10	325	125
1959	125	850	–	975	475	1	409	90
1960	90	775	–	865	490	4	286	85
1961	85	950	–	1,035	490	2	458	85
1962	85	1,080	–	1,165	500	2	568	95
1963	95	1,150	–	1,245	530	–	587	128
1964	128	1,500	–	1,628	600	15	773	240
1965	240	1,500	–	1,740	625	15	920	180
1966	180	1,750	–	1,930	665	16	1,049	200
1967	200	1,800	–	2,000	710	15	1,040	235
1968	235	2,000	–	2,235	760	30	953	492
1969	492	1,835	–	2,327	800	22	1,138	367
1970[2]	367	1,837	–	2,204	800	25	1,150	229

[1] Bales of 480 pounds net.

[2] Preliminary.

TURKISH COTTON ACREAGE, PRODUCTION, AND YIELD



The rapid increase in cotton production during this period was associated with strong export demand for cotton and high prices. Internally, the introduction of an upland (Gossypium hirsutum) variety of cotton, Acala, which gives must higher yields and has a longer staple length than the native closed-boll Yerli variety (Gossypium herbaceum), was important.

So large a shift to cotton meant that the agricultural economy of the Mediterannean coast of Turkey underwent major changes. Farming that had been highly diversified, with both crops and livestock playing important roles, was transformed into a monoculture on many farms. Villages and cattle numbers declined drastically. Rotations were eliminated for the most part, and cotton characteristically followed cotton.

From 1952 until 1964, cotton acreage in Turkey failed to rise further, but both yields per acre and production more than doubled. Thereafter, the acreage rose a little higher to an all-time peak of 1.8 million acres in 1966-68, but in 1970 it declined quite drastically to less than 1.4 million acres—the lowest level since 1950. The cotton yield per acre continues to rise, however, and in 1970 was 676 pounds, or three times the yield of 1954. Despite the rising yield, the decline in acreage was sufficient to drop 1970 cotton production to 1.8 million bales from a peak of 2.0 million in 1968.

Cotton yields have continued to rise as more and more of the cotton acreage has been placed under irrigation. Another important factor has been the substitution of higher yielding Coker and DPL varieties, which mature 25 days earlier, for the formerly important Acala variety. Also, undoubtedly, cotton farming in Turkey has become more sophisticated as to cultural practices, use of fertilizer, and insect control.

The failure of cotton acreage to increase during the late 1950s and early 1960s reflects the fact that cotton on nonirrigated areas and at prevailing prices was not too remunerative. On irrigated areas, cotton competes with such crops as citrus, fruits, vegetables, alfalfa, and other oilseeds, which under the right circumstances can provide a high financial return.

The decline in cotton acreage in 1969 and 1970 is said to have been the result of disappointing prices for cotton plus initial high yields and excellent returns from Mexican wheat, which had only recently been introduced. While Mexican wheat did not provide anywhere near the gross value per acre of cotton, the costs of growing it were said to have been much lower. Also, there may have been increased plantings of other field crops, fruits, and vegetables.

Yields from Mexican wheat in 1969 and 1970 on a greatly increased acreage, however, are said to have been much lower than anticipated on the basis of the initial experience on selected small acreages. On the other hand, the devaluation of the Turkish lira in August 1970 led to greatly increased returns for the 1970 cotton crop. Consequently, some revival in interest in cotton is expected in 1971.

As indicated in Appendix Table 1, cotton acreage in Turkey, was less in 1970 than in 1969. In contrast, the acreage devoted to oilseeds other than cottonseed, notably sunflowerseed, rose very considerably during the period, as did the acreage of tobacco and plantings of citrus, olives, deciduous fruits, and nuts. The most notable decline was in sugarbeets.

Cotton producing areas

For a number of years Turkey has had three major cotton producing regions, all of them along the Mediterannean and Aegean coast. In order of usual production volume they are the Cukurova, the Aegean, and Antalya. In addition, a new zone is opening up in the Euphrates drainage basin, which is broadly described as centering in and above Urfa Province in East Central Turkey.

Cukurova.—This is by far the largest cotton growing area in Turkey with 59 percent of the average acreage and 49 percent of the average production during 1965-69. The Cukurova region lies not far inland from the northeastern corner of the Mediterannean Sea, near the Syrian border, and includes the important Adana Plain to which the Seyhan Irrigation Project, under development since the 1940s, is bringing water. Adana Province accounts for about two-thirds of the cotton acreage, but Icel and Hatay Provinces are also important. A smaller amount of cotton is grown in Maras.

Although cotton is highly important throughout the area, a larger acreage is devoted to grains, mostly wheat but with some barley, oats, and other grains. Considerable acreages also are devoted to vegetables, sesameseed, grapes, peanuts, and citrus.

Average yield and production of cotton in Turkey, by producing regions

Year beginning August 1	Cukurova	Aegean	Antalya	Other	Total
Acreage:	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*
1960-61	889	450	74	121	1,534
1961-62	933	476	72	123	1,604
1962-63	936	494	72	129	1,631
1963-64	915	491	73	74	1,553
1964-65	985	540	73	112	1,680
1965-66	1,028	493	80	92	1,693
1966-67	1,038	530	83	108	1,759
1967-68	1,021	557	83	112	1,773
1968-69	1,023	528	87	123	1,761
1969-70	940	439	81	118	1,578
1970-71	611	517	82	94	1,304
Yield:	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
1960-61	155	357	359	227	230
1961-62	236	417	270	240	291
1962-63	273	439	338	333	331
1963-64	253	536	335	314	349
1964-65	342	576	602	246	428
1965-66	368	639	651	254	425
1966-67	389	644	770	306	479
1967-68	391	657	862	325	492
1968-69	442	710	993	373	545
1969-70	458	748	976	373	559
1970-71	616	756	1,062	290	676
Production:	*1,000 bales*[1]	*1,000 bales*[1]	*1,000 bales*[1]	*1,000 bales*[1]	*1,000 bales*[1]
1960-61	287	335	55	58	735
1961-62	458	414	41	61	974
1962-63	533	452	51	48	1,125
1963-64	482	549	51	48	1,130
1964-65	702	649	92	57	1,500
1965-66	788	656	108	48	1,500
1966-67	841	712	133	68	1,754
1967-68	831	763	149	76	1,819
1968-69	941	781	181	96	1,999
1969-70	896	684	165	92	1,837
1970-71	785	814	181	57	1,837

[1] 480 pounds net.

Soils are fairly heavy near the sea, generally lighter farther inland. In the Adana area there are usually only 7 or 8 days of frost during the year with the last frost usually in late February or early March and the first frost in December. Average afternoon temperatures in July and August are in the low 90s F. Very little rain falls during the summer, and water stress is clearly evident in nonirrigated fields. Practically all of the annual average rainfall of 24.3 inches (Adana) falls from October through May (see Appendix Table 2). In some years, heavy rainfall beginning as early as September can have a highly adverse effect on the cotton crop just as it is ready to be picked. The substitution of earlier maturing varieties has been helpful in this connection.

In the Cukurova region most of the cotton is produced on relatively large holdings. Farms of up to several hundred acres are common, and some occupy several thousand acres. Much of the cotton is produced under owner-operator arrangements. Hired laborers are utilized in periods of heavy workloads, and sufficient manpower is sometimes difficult to obtain. Sharecropper arrangements are used on some of the larger farms.

As in most cotton areas in Turkey, few farmers follow a rotation system. Nearly all land preparation has been mechanized, but in later stages of cultivation mechanization has been made more difficult by irrigation and the use of 31-inch rows. Picking, which usually begins in August, is handled with transient laborers as well as local ones. Many family groups come down annually from the Anatolia Plateau to pick cotton.

The acreage in cotton showed a gradual but steady upward trend in the Cukurova region until a peak of 1,038,000 acres was attained in 1966. Thereafter, the acreage declined—moderately in 1967 and again in 1969 and then abruptly in 1970 to the lowest level in many years.

Dissatisfaction with cotton prices and greatly increased plantings of Mexican wheat were among the factors responsible. In 1968-69, around 620,000 acres were planted to Mexican wheat in the Cukurova region, one-third of Turkey's entire acreage in this crop.

The share of cotton acreage grown under irrigation is much greater now—74 percent in 1970—than 10 years ago, and with increased irrigation, higher yielding varieties, and better farm practices, yields are more than double the 1960 level. As of March 1971, the indicated cotton production in the Cukurova region was 764,000 bales, compared with the 1968-69 record of 941,000.

Aegean.—The Aegean region centering around the city of Izmir on Turkey's western Aegean coast, is the second most important cotton producer. Like the Cukurova region, it has around 25 inches of rainfall annually but with rainfall very sparse in the late spring and summer. Temperatures run a little lower than at Adana in the Cukurova region, but the growing season has about the same length. In most recent years, the Aegean region has accounted for nearly one-third of both Turkey's cotton acreage and cotton production. In some years production is larger than the Cukurova region, and in 1970 the Aegean region had nearly 40 percent of the acreage and 46 percent of the production. Aydin, Izmir, and Manisa Provinces provide more than three-fourths of Aegean cotton acreage and production; Denizli, Mudly Balikesir, Bursa, and Canakkale, the remainder.

Cotton acreage in the Aegean region has remained around the same general level for the last 10 years. The peak acreage was in 1967, and there was a substantial decline in 1968 and 1969 followed by a recovery in 1970.

Yields and production, however, have followed a marked upward trend. Both tend to fluctuate more than might be expected from one year to the next because of highly variable weather conditions, with cool, wet springs that often delay land preparation and planting and local situations regarding the supply of irrigation water and method of application. The record cotton production in 1970 of 827,000 bales was associated with a considerable recovery in acreage after fields planted to Mexican wheat were rained out and farmers planted cotton the following spring. In the fall, the quality of the cotton crop occasionally is lowered by rains at harvesttime in September and October, a situation that is aggravated by frequent scarcity of labor for picking.

The cotton acreage in the Aegean region is second only to a four- or-five-times-larger acreage planted to grain, about half wheat. Tobacco and grapes rival cotton in acreage, and pulses, vegetables, olives, and sunflowers are also important. Small acreages of figs and citrus are scattered in areas where soil, water, and climate make production feasible. For the most part, cotton is grown on relatively deep alluvial soils.

Farms tend to be much smaller than in the Cukurova region, with holdings generally well under 100 acres, and farms of only a few acres are common. As in other parts of Turkey, fragmentation of holdings is a problem. The owner-operator and his family usually supply most of the labor except during harvest.

Antalya.—The Antalya region (Antalya Province), where one-tenth of Turkey's cotton is grown, is on the Mediterannean Sea between the Aegean and Cukurova regions. Average annual rainfall exceeds 40 inches, and the cotton growing season is hot and relatively humid. Winters are relatively warm, and there usually are only 2 days with frost during the year. Cotton can be grown without irrigation even though rainfall is sparse during the summer. Supplemental irrigation, however, is applied to probably about 90 percent of the acreage. Yields have increased sharply from around 270 to 360 pounds per acre in the early 1960s to around 1,000 since 1968. The latter is the highest yield of the major cotton-growing areas.

For the most part, soils here are alluvial; relatively heavy near the sea and lighter inland. Cotton is produced on a comparatively small proportion of the cropland. The grain acreage, mostly wheat, is several times greater than the cotton acreage, and vegetables, melons, and sesame are also important. Some years ago, insects took a heavy toll in Antalya, but more recently, control has been generally adequate.

The general feeling seems to be that cotton is a strong competitor for the acreage now devoted to it but that the cotton area has little prospect of expanding significantly above the 35,000-hectare level achieved in 1968 and again in 1970.

Other areas.—Cotton is grown on small acreages in several other areas of Turkey, under conditions ranging from extremely primitive to fairly modern. The only such area of both present and potential significance is the drainage basin of the Euphrates River. Currently, the greatest concentration of cotton shown in the accompanying table is raised in and to the north of the Province of Urfa. Long-term development plans envision a series of dams at strategic positions on the upper river and tributaries that will bring large acreages under irrigation for intensive agriculture. Various cotton leaders in Turkey, noting the success to date of irrigated cotton in the Euphrates Valley, state that when developed the region can "be another Cukurova" so far as cotton production is concerned.

Of course, the upper limit of this potential will not be achieved for many years, nor before many millions of dollars of capital investment in major engineering works. However, the small-scale irrigation to date makes this a zone to watch for future developments. Those close to Turkish cotton believe that continued growth in the Euphrates Valley—even in the next few years—will offset any cutbacks in the Cukurova as some of its irrigated land is shifted from cotton to other crops.

Cotton area under irrigation in turkey

Area and year	Total	Irrigated	Percent of total	Area and year	Total	Irrigated	Percent of total
Cukurova:	*1,000 acres*	*1,000 acres*	*Percent*	Antalya:	*1,000 acres*	*1,000 acres*	*Percent*
1963	915	310	34	1963	72	55	76
1967	1,021	518	51	1967	87	73	84
1970	611	446	73	1970	82	77	94
Aegean:				Total Turkey:			
1963	491	401	82	1963	1,553	802	52
1967	558	506	91	1967	1,774	1,182	67
1970	517	476	92	1970	1,304	1,056	81

Source: Compiled from *Turkiye de Pamuk Ekonomisi* by Nurettin Madran, published by Kemal Matbaasi, Adana, 1967, and from manuscript date.

Acreage of irrigated crops in Turkey, 1967, and plan for 1972

Crops	1967		1972 plan	
	Area	Percent of total	Area	Percent of total
Industrial:	*1,000 acres*	*Percent*	*1,000 acres*	*Percent*
Cotton	988	25.8	1,112	23.2
Sugarbeets	272	7.1	371	7.7
Sunflowers	173	4.5	296	6.2
Other	198	5.2	272	5.7
Total	1,631	42.6	2,051	42.8
Cereals:				
Wheat	494	12.9	655	13.6
Rice	141	3.7	163	3.4
Corn	185	4.8	247	5.2
Other	99	2.6	148	3.1
Total	919	24.0	1,213	25.3
Other:				
Pulses (feed)	247	6.5	346	7.2
Citrus fruits	92	2.4	111	2.3
Other fruits	346	9.0	445	9.3
Vegetables	593	15.5	630	13.1
Total all crops	3,828	100.0	4,796	100.0

Source: *Second Five-Year Development Plan, 1968-72,* Central Bank of the Republic of Turkey, Ankara, 1969.

The increasing importance of irrigation

In recent years the proportion of the Turkish cotton crop grown under irrigation has increased rapidly owing to (1) the development of irrigation facilities, (2) the greatly increased yields to be realized from irrigating cotton, and (3) phasing out of rain-grown cotton because of increased competition from Mexican wheat for non-irrigated lands and dissatisfaction with returns from cotton. In 1961, only 43 percent of Turkey's cotton acreage was irrigated but by 1967 the proportion had risen to two-thirds, by 1969 to 72 percent, and by 1970 to between 80 and 85 percent.

More than 90 percent of the cotton acreage in the Aegean and Antalya regions is now under irrigation. In Cukurova, 60 percent of the cotton acreage was under irrigation in 1969, but with the drastic curtailment of cotton acreage in 1970, the rain-grown area suffered more than the irrigated area, and the irrigated proportion may now be nearly three-fourths of the total.

Development under the 5-year plans.—Continued and increased reliance on irrigation for cotton is indicated by Turkey's National Development Plan. In all, Turkey has 58.1 million acres of agricultural land, of which 21.0 million could eventually be irrigated considering land and water potential. In 1967, only 3.8 million acres were under irrigation, but it was hoped under the Second Five-Year Plan (1968-1972) to raise this total to 4.8 million by 1972. However, as noted in the Plan report, "one of the principal problems . . . is the time gap between completion of the dams, main canals, etc., and the adoption of advanced wet-farming techniques."

Although irrigation facilities up to and including the canal network were completed for 1,097,000 acres between 1963 and 1967, only 494,000 acres were actually brought under irrigation.

Cotton had a larger irrigated acreage, 988,000 acres, than any other crop in 1967, taking one-fourth of Turkey's entire irrigated acreage. The irrigated cotton acreage was to rise, according to the Plan, to 1,112,000 acres by 1972, but no increase was contemplated in rain-grown acreage. The Plan report notes that

> Since the possibility of increasing cotton acreage is limited, any possible increase will be connected with the development of irrigated land. The estimated increase in land to be brought under cotton cultivation, recognizing the alternative use of the land for fruit and vegetable cultivation, and a 17.2 percent average increase in productivity will lead to a 25.7 percent increase in cotton production. The increase in productivity will be insured by the use of fertilizers on all the irrigated cotton land, use of selected seed and crop rotation.[1]

Irrigated cotton in 1976 projections.—Longer-term official projections for 1976, made in 1966, also placed greatly increased emphasis on irrigation in Turkey's cotton economy. The projections called for Turkey's total cotton acreage to be increased by 21 percent between 1966 and 1976, with rain-grown cotton practically phased out—from 642,000 acres, or 37 percent of the total, in 1966 to only 128,000 acres, or 6 percent, in 1976—and irrigated acreage to rise to 2,001,000 acres.

Cotton yields on irrigated land were to climb from 574 to 672 pounds per acre, and on the declining amount of dry land, from 290 to 326 pounds. With all this, production of cotton was to be increased from 1.75 million bales in 1966 to 2.2 million in 1970 and 2.9 million in 1976.[2]

As of the spring of 1971, the percentage of the cotton acreage that was irrigated was increasing quite in keeping with the official projections. And yields were well ahead. But the total cotton acreage, instead of expanding, was considerably smaller in 1970 than in 1966, with little gain in irrigated acreage and a large drop in rain-grown acreage. Consequently, production of cotton in Turkey in 1970 was scarcely any larger than in the base period.

The Seyhan Project.—Irrigation capacity in the Cukurova region is being steadily increased by the Seyhan River Project. Development under this project, which serves the 544,000-acre Adana Plain, began in the 1940s when a diversion dam on the Seyhan River, right and left bank main canals, and a partial distribution system for about 41,000 acres were completed. By 1956, an earth-filled dam, storing enough firm water to irrigate about 420,000 acres, plus power and flood-control facilities, had been completed but without canals and on-farm work to get the stored water onto the land.

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[1] *Second Five-Year Development Plan*, 1968-72, published by Central Bank of the Republic of Turkey, Ankara, 1969, p. 355.

[2] Nurettin Madran, *Turkiye de Pamuk Economisi*, Kemal Matbaasi, Adana, 1967, pp. 39-40.

Under a Stage I Seyhan Project, partly financed by a loan from the World Bank and a credit from the International Development Association (IDA) in 1963, irrigation and drainage works for 153,000 acres were completed in December 1968, and on-farm development for this acreage is to be completed by 1972.

In the meantime, a Stage II project, partly financed in February 1969 by the World Bank and the IDA, is underway. Under this stage, the total irrigated area is to be increased by means of irrigation and drainage works and on-farm development to approximately 250,000 acres by 1974, at an estimated cost of $63 million.[3]

The Government of Turkey plans eventually to have a Stage III project; however, costs would be high in relation to benefits, and it will probably not be undertaken for many years.

Plans for the Seyhan project call for the former largely raingrown cotton acreage on the Adana Plain to be reduced by nearly half and the remainder to be irrigated, for a resultant tripling of yields and doubling of irrigated production. The former cotton acreage would be replaced, according to the Plan, by increased irrigated acreages of citrus, other fruits, vegetables, rice, oilseeds, alfalfa, etc., with double cropping of dry beans, melons, and vegetables in the winter. These plans were made, however, before Mexican wheat became important.

Irrigation along the Euphrates.—As noted in the section on cotton-producing areas, long-term development plans call for a series of dams to irrigate the drainage basin of the Euphrates River, but the potential is not likely to be achieved for many years and before heavy expenditures in major engineering works.

Influence on yields.—Turkey's rapid change-over from a largely rain-grown to a largely irrigated cotton crop has been strongly influenced by the much higher yields to be obtained from irrigation. Since rainfall is scarce during much of cotton's growing period in late spring and summer, provision of water is highly important.

Yields of cotton from dry farming on the Adana Plain were estimated in 1967-68 to run around 205 pounds of lint per acre, compared with around 683 pounds under irrigation and the prospect of at least 800 pounds as improved practices became widespread. For all of Turkey, irrigated yields were estimated in 1966-67 to average at least double the rain-grown yields.[4] But in the Antalya area, irrigated yields in 1968-70 averaged at least 981 pounds per acre, compared with an all-Turkey rain-grown yield in 1966 of only 290 pounds. While other factors are involved in such comparisons, obviously irrigation was the major difference.

Production practices

Scale of operation.—Turkey has 232,000 cotton farmers, and in 1966 the average area per farmer was only 7.6 acres. Four out of five farmers had less than 12.5 acres, but one-fourth of all of Turkey's cotton acreage was still in holdings of 125 acres or more. Of the major cotton regions, farms are smallest in the Aegean area and largest in the Cukurova. More than one-third of all cotton farms in the Cukurova region had 125 acres or more planted to cotton, compared with only 15 percent in the Aegean region. At the other end of the scale, only 12 percent of the Cukurova farmers had a cotton acreage of less than 12.5 acres compared with 45 percent in the Aegean region. Farms in the Antalya region are intermediate in size, with few large holders. Elsewhere in Turkey, average cotton plots are very small.

Mechanization.—Cotton production has helped to introduce a commercial concept into otherwise basic subsistence farming in Turkey's village-economy agriculture.

Cotton is produced under methods that range from primitive to relatively advanced. For the most part, tractor machinery is used in preparation of land for planting, while the remaining operations are performed by hand or with animal power. Large-scale farming in some parts of Turkey, the spread of agricultural education to farm operators, and a number of years of highly profitable returns from cotton production have all contributed to the adoption of many advanced cultural methods. Also, a limited supply of labor in some regions has speeded the shift to mechanization.

Nevertheless, certain cultural practices inhibit a rapid shift to more complete mechanization. Most cotton lands are relatively level, but virtually no fields are naturally sloped for large-scale row irrigation. Except on the Seyhan Irrigation Project, little land leveling has been done, and most leveling equipment is of primitive design.

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[3] From mimeograph reports on the Seyhan Irrigation Project.

[4] See footnote 2, page 9.

Size of cotton farms in Turkey, 1966

Item	Cukurova	Aegean	Antalya	Other	Total
Cotton acreage per farmer:	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Less than 12.5 acres	11.6	44.5	29.0	58.3	25.1
12.5-25	27.1	23.6	29.2	17.3	25.6
25-124	27.5	17.1	14.3	11.9	22.8
124.5-247	24.4	6.3	22.6	7.4	17.8
247 and over	9.4	8.5	4.9	5.1	8.7
Total	100.0	100.0	100.0	100.0	100.0
	1,000 acres	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*
Total acreage	1,037.6	530.6	83.1	108.1	1,759.4
Number of farmers with cotton acreage of:	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Less than 12.5 acres	76.6	85.0	78.7	96.1	81.6
12.5-25	16.0	12.3	16.1	2.7	13.4
25-124	6.2	2.4	3.8	.9	4.2
124.5-247	1.0	.2	1.2	.2	.6
247 and over	.2	.1	.2	.1	.2
Total	100.0	100.0	100.0	100.0	100.0
	Thousands	*Thousands*	*Thousands*	*Thousands*	*Thousands*
Total farmers	114.7	84.6	9.9	22.4	231.6
	Acres	*Acres*	*Acres*	*Acres*	*Acres*
Average cotton acreage per farmer	9.0	6.3	8.4	4.8	7.6

Source: *Turkiye de Pamuk Ekonomisi,* by Nurettin Madran, published by Kemal Matbaasi, Adana, 1963-1967, p. 32.

Because of the uneven land, cotton is basin-irrigated in most places. Sometime after the land has been prepared, but before the first water has been applied, low dikes are thrown up throughout the field. The dikes surround plots ranging from perhaps 10 yards square to areas several times larger. Irrigation water is pumped to the highest point, from which each successively-lower plot is flooded. Despite smallness of the basins flooded, cotton in low spots suffers from excess water, while plants on high spots fail to receive enough. In addition to causing inefficient use of water, the basin irrigation of small plots prevents the use of mechanized equipment for cultivation or for harvesting.

Narrow row spacing is another impediment to the use of cotton machinery in Turkey. Rows in most fields are only about 2½ feet apart. In planting, seed is generally hand-dropped at a rate that is at least twice as heavy as is common in the United States, although cotton planters pulled by tractors are gaining in use. Later, the plants are thinned to a stand somewhat thicker than is common in this country. The thick stand on the narrow rows results in plant populations substantially in excess of average populations in the United States. However, the height of Turkish cotton tends to be somewhat shorter than that of irrigated plants in this country.

Herbicides.—Weeds, notably Johnson and Bermuda grasses are a serious problem in many fields and are becoming even more of one with increased irrigation of cotton. Typically, cotton fields are hand-hoed or a combination of hand-hoed and machine cultivated at least five times. Herbicides are seldom used because they are considered very expensive, despite Turkish research showing that a combination of herbicides and hand-hoeing would result in better control of grass and weeds with the combined benefits of higher yields and reduced trash in the picked cotton.

Even though research findings bear out the above relationship, any major impact on the nation's cotton industry is still years ahead. Treflon was used on 50 acres of cotton in both 1967 and 1968 and on 85 acres in 1969. It is thought that its use rose to 370-500 acres in 1970. Three other herbicides—Karmex, Cotoran, and Herban—were also used on cotton in 1970, but it is unlikely that as much as 5 percent of the total acreage was treated with herbicides in total. Farmers complain that herbicides are very expensive.

Water and drainage.—More than three-fourths of Turkey's cotton acreage now is irrigated. Most of the rain-grown cotton is in the Cukurova area. About half of the water is pumped out of streams, rivers, or relatively shallow wells by individual farmers, while the remainder is obtained from Government canals. The Government makes a flat charge per unit of land for irrigation water on Government projects. This rate differs for each crop—being higher for vegetable farming than for sugarbeet and cotton growing. Government specialists advise farmers on the use of water.

For many years, expansion of irrigation capacity ran far ahead of needed drainage, with the result that soil salinity became a serious problem in some areas. More recently, drainage facilities have been expanded so that salinity has not increased noticeably. New irrigation projects have been coupled with drainage work.

Typically, cotton land is irrigated four or five times a year. Basin irrigation is the usual practice, although furrow irrigation is becoming more important.

Fertilizer.—Contrasted with the situation of only a few years ago, a major part of the cotton on irrigated land now receives some fertilizer. Consumption of fertilizer continues to rise, and now some is even used in dry farming. For the most part, rates of application are relatively low; research shows that substantially heavier applications, especially of nitrogen, would be profitable. In the Aegean region, only nitrogen and phosphate fertilizers are used since the soils contain adequate potash.

Most commercial fertilizer is imported by the Ministry of Agriculture, with domestic production limited to relatively small quantities of higher-priced fertilizers. The imported fertilizer is resold to farmers at prices equal to the high-priced local product. Additional production of domestic fertilizer is expected within the next few years, although Turkey is likely to need large imports for the foreseeable future.

Pest and disease control.—In Turkey, cotton is attacked by all of the major cotton insects except the boll weevil and the jassid. The bollworms, both pink and common, are probably most destructive. Generally, insect control has been adequate. A large proportion of insecticides are imported, mostly from European sources.

Farmers have access to a wide range of insect controls, including systemics. Reportedly, farmers control insects on most irrigated land, but relatively little rain-grown cotton receives protection. It has been reported that in 1969 about eight applications of insecticide were required on irrigated cotton for effective control in the Cukurova, up from six applications in 1968. On the other hand, many farmers in 1970 were able to get by with only three treatments. Specialists with the Ministry of Agriculture—as well as insecticide salesmen—recommend to the farmer what poison to apply and when.

Most insecticides are applied with hand or tractor equipment, but there is some aerial spraying.

Other methods of control include heat-sterilization of planting seed, and destruction of cotton stalks after harvest; however, a common practice is to let animals graze after cotton is picked and to use stalks for winter fuel.

Although pest damage has been held to a minimum in most seasons, insects will surely become more difficult to control in the future. The need for more intensive control measures will become greater should insects develop resistance to the insecticides used and when the population of beneficial insects has been reduced.

The most serious disease problems in Turkey are *fusarium and verticillium wilt*, which are said to be causing a loss of 14-17 percent of the crop in the Aegean region. In the last several years, there also has been a problem with Phizoctonia seedling disease.

Harvesting.—All Turkish cotton is hand picked, and two or three pickings is the practice. The cotton is gathered in small bags, aprons, or small baskets then emptied into larger bags and hauled to the gin on trailers pulled by a farm tractor, or on trucks or animal-drawn carts or wagons. Much more labor is needed at harvesttime than during the growing season, so large numbers of laborers—often as family groups—migrate to the major cotton areas at harvesttime. The migratory workers camp in wagons, tents, or other improvised shelter near the fields where they are working. In general, they are expected to stay on the farm where they start to work until that farmer's crop is completely harvested. They may then move on to other farms.

In 1969 and 1970, the wage most commonly paid to pickers in the Cukurova was 25 kurus per kilogram of seed cotton for the first picking and 35 kurus for the second and third. This was equivalent to 1.3-1.8 U.S. cents at the exchange rate prevailing before August 1970; 0.9-1.3 U.S. cents thereafter.

Varieties and seed distribution

Originally, a short, harsh Asiatic variety, Yerli, was the principal cotton variety grown in Turkey, but it now accounts for less than 2 percent of the acreage. All of the rest is planted to American Upland varieties.

In the early 1960s strains of the Acala variety were replaced by Coker and Deltapine varieties, which gave much higher yields and matured 25 days earlier, a highly important consideration given the usual time of arrival of the fall rains, which could ruin the crop at picking time. By 1969, Deltapine 15/21 was planted on 53 percent of Turkey's cotton acreage, Coker 100 A/2, on 44 percent, and Carolina Queen (Coker 201), Sealand (a long-staple variety), and Yerli, on the other less than 4 percent.

Acreage planted to specified cotton varieties, 1969

Variety	Region				All of Turkey
	Cukurova	Aegean	Antalya	Other	
	Percent	*Percent*	*Percent*	*Percent*	*Percent*
Coker 100/A2	23.3	99.0	5.9	23.9	43.5
Deltaphine 15/21	67.6	–	93.9	57.0	52.9
Carolina Queen	2.7	–	–	–	1.6
Yerli-Sealand	6.4	1.0	0.2	19.1	2.0
Total	100.0	100.0	100.0	100.0	100.0

Deltapine 15/21 was selected from a single plant in 1954 after a number of years of regional selection trials beginning with the importation of a small quantity of Deltapine 15 in 1948. Multiplication began in 1961. Improvement of this variety has been continued by the scientists at the Adana Regional Cotton Research Institute, and the present Deltapine 15/21 is reported to have yielded 15 to 20 percent higher in recent regional variety tests than Deltapine 15.

Coker 100/A2 is an improved selection from Coker 100/A, in turn selected over the years from Coker 100, small quantities of which, with several other varieties, were brought from the United States in 1948. Two selections made from Coker 100/A2 in 1964, 64-9 and 64-10, are being multiplied, and certified seed will be made available to farmers in 1971. The new selections are reported to produce significantly higher yields.

More than 95 percent of the nearly 30,000 metric tons of cottonseed planted annually in Turkey is certified (or better) seed that has been prepared under the selection improvement programs conducted under the direction of the Regional Cotton Research Center at Adana and Nazilli. The remaining planting seed, which is of the same minimum certification level, is produced by farmers for use on their own farms.

While much progress has been made in Turkish cotton varieties, both Government officials and farmers are aware of certain problems. One of these concerns *verticillium* wilt, against which current varieties are reportedly less tolerant than were former varieties. Also, there are indications that present varieties are not as well liked as former ones so far as ease of picking is concerned. Local textile mills find present varieties less well suited than former ones to meet some of their more highly specialized spinning requirements.

There is some mill sentiment that Turkey should develop at least some production of longer and stronger cotton. Such cottons, it is maintained, are needed by the mills interested in spinning higher count yarn at higher operating speeds and would help mills with chemical finishing problems. To meet this need, hybrids between DP15 and Acala and between Coker and Acala have been developed and are to be registered as official varieties. Attention also is being given to Coker 210. Thus far, however, none of the longer and stronger varieties have sufficiently demonstrated high yield and other desirable characteristics to make volume production feasible from an economic standpoint.

ECONOMIC ASPECTS OF PRODUCTION

Financing

Agricultural credit is obtained from a number of sources, principally the agricultural banks and cooperatives. The agricultural banks lend money for a variety of short-term and long-term needs at an annual rate of about 6 percent. Agricultural credit cooperatives provide loans for the purchase of planting seed, fertilizer, insecticides, machinery, and for the improvement and purchase of land. While availability of credit from cooperatives and banks has increased considerably in recent years, many farmers find it necessary to borrow money from local lenders at relatively high interest rates. Merchants also provide credit.

Cost of production

Turkey, like every other country, has a wide range in production costs to farmers. In practically every year, farmers who are efficient and successful in achieving high yields are able to make good operating profits, while others who do not reach even average yields are likely to have difficulty breaking even.

The summary of cost and income data, given in the following table, and the details, given in Appendix Table 3, are based on returns from questionnaires sent to farmers and, like similar returns in other countries, may tend to exaggerate costs and thus understate returns to operators.

Costs and returns from producing cotton in Turkey[1],[2]

Item	Aegean, irrigated, 1968	Cukurova					
		Irrigated			Nonirrigated		
		1968	1969	1970	1968	1969[3]	1970[3]
	Pounds per acre	*Pounds per acre*	*Pounds per acre*	*Pounds per acre*	*Pounds per acre*	*Pounds per acre*	*Pounds per acre*
Yield of cotton lint	686	583	686	652	206	197	206
	Dollars per acre	*Dollars per acre*	*Dollars per acre*	*Dollars per acre*	*Dollars per acre*	*Dollars per acre*	*Dollars per acre*
Gross income from seed cotton	213	170	202	179	60	58	57
Costs:							
Direct	142	117	146	131	45	43	44
Land and overhead	56	45	[4] 45	[4] 34	22	[4] 22	[4] 17
Net return from seed cotton:							
Before land and overhead	71	53	56	48	15	15	13
After land and overhead	15	8	11	14	-7	-7	-4
	Cents per lb.	*Cents per lb.*	*Cents per lb.*	*Cents per lb.*	*Cents per lb.*	*Cents per lb.*	*Cents per lb.*
Value of cotton lint[5]	26.1	24.1	23.7	22.4	24.1	23.7	22.4
Adjusted cost of cotton lint[6]:							
Before land and overhead	15.7	15.1	15.5	14.9	16.9	16.1	16.1
After land and overhead	23.8	22.7	22.1	21.8	27.8	27.5	27.0

[1] Converted from Turkish lira at 9.00 lira to a dollar in 1967-1969 and 12.00 lira in 1970. Actually, the exchange rate was changed in August 1970, so costs in 1970 were largely incurred when the old rate was in force while the cotton was sold when the new rate was in force. [2] Abstracted from Appendix Table 3. [3] Average of data for sloping and bottom lands.
[4] Land and overhead cost estimated as same in lira per hectare as in 1968. [5] Gross income from seed cotton less value of cottonseed divided by yield per acre. [6] After deducting value of cottonseed. Does not include ginning costs.

One study comments that "to meet the rent requirements, the farmer in many cases must undertake obligations that exceed his financial abilities. . . ."[5] To meet this cost and to finance production costs, the farmer borrows at rates ranging from a legal 9 percent for short-term interest to as high as 50 percent or more. "In all cases a 10 percent increase on expenditure as a minimum interest repayment rate would not be exaggerated."

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[5] Seyhan Irrigation Project Extension Service, 1969 Summary Report, Adana, January 1969.

The study comments further: "Due to the lack of adequate financing most farmers cannot respond to the challenge of intensive agriculture created by the new irrigation system [in the Seyhan project]. The farmers lack money for necessities and lack money management experience. The national scarcity of credit and the private money lending practices push the farmer into crippling debt. Single-crop agriculture accentuates the problem by concentrating demand on credit facilities."

In the traditional cropping sequence cotton follows cotton. The cotton cycle begins in the fall with the cutting of stubble of the previous crop and deep plowing. This is typically followed in the winter and spring by three tilling operations, by smoothing several times with a tapan or log pulled by a tractor, and then planting. Seed costs the farmer 5.7 cents per pound, and fertilizer is reported to cost 3.5 cents per pound; it typically costs a farmer between $20.00 and $24.00 per acre for the fertilizer and another 90 cents per acre (at 9.00 lira per dollar) for applying it on irrigated land. The cost of fertilizer in Turkish lira is likely to rise in 1971 because about two-thirds of the fertilizer used in Turkey is imported, and prices are likely to feel the impact of devaluation.

Insect control appears to be the largest single expense in raising cotton, costing $27 per acre in irrigated Cukurova in 1969 and 1970 for the chemicals and an additional $9 to $11 per acre for applying them (at 9.00 lira to the dollar). These costs were considerably higher than in 1967 and 1968. Here again, costs in Turkish lira are likely to rise because of the devaluation.

The data indicate that a typical farmer raising cotton without irrigation in the Cukurova region, with yields of around 200 pounds per acre, had an operating income before rent and overhead of only about $10 to $15 per acre in 1968 and 1969. Here we may have an important reason for the rapid decline in the acreage of unirrigated cotton in Turkey in the last few years. In 1970, costs rose in Turkish lira, but the return improved considerably because of higher prices in Turkish lira for lint cotton, largely incident to devaluation of the lira in August 1970.

On irrigated land, direct costs are roughly triple the costs on unirrigated land, but net returns are four times larger. Typical incomes before rent and overhead ran from $53.00 to $71.00 (at 9.00 lira per dollar) per acre, while the cost of producing cotton lint before rent ran around 17 to 18 cents per pound, including cost of ginning. But returns can go much higher and costs much lower than this if farmers are able to realize high yields.

For instance, under an intensive extension program on the Seyhan irrigation project in the Cukurova region, farmers averaged yields of 960 pounds of lint per acre in 1968, compared with 580 pounds typical for irrigated cotton elsewhere in the region. This resulted in an average return of $115 per acre, compared with $53, and a cost of only 12 cents a pound after ginning (at 9 lira per dollar) before rent. The available data also indicates lower costs and higher returns in the Aegean region than in the Cukurova area.

Most Turkish cotton farmers own the land they work. If the farmer is landless, he must pay his rent before receiving the land for cultivation. Typical rents in 1970 were $11.00 to $22.50 per acre (at 9.00 lira per dollar) for unirrigated land in the Cukurova region, at least $45 per acre for irrigated land in the same region, and $56 for irrigated land in the Aegean region. Such rents can take a major share of the income from growing cotton—sometimes enough, if expenses are as large as indicated, to throw the net return after rent into the red.

Weed control is also a very major cost: $29 per acre (at 9.00 lira per dollar) in irrigated Cukurova in 1970, up considerably from 1968 and 1969. This item is likely to cost more in the future because weeds are becoming more and more of a problem with the spread of irrigation.

Irrigation costs run in the range of $12 to $18 per acre.

Picking cotton reportedly cost 1.3 cents per pound of seed cotton in 1969 and 1970, although a third cleanup picking costs up to 5.0 cents per pound. The cost per pound was around 1.1 cents in 1967.

Although Turkey has plenty of labor, picking costs are likely to continue to rise in the years ahead because of rising costs of living.

Ginning cotton was reported to cost around 55-60 kurus per kilogram of lint cotton (2.8-3.0 cents per lb.) on roller gins and 50 to 55 kurus (2.5-2.8 cents) on saw gins in 1970. This cost was said to be 10 kurus higher than in 1968. It costs another 25 kurus (1.3 cents) to get lint cotton from the gin to shipside and perhaps 50 kurus per kilogram (2.5 cents per lb.) to cover f.o.b. expenses and the exporter's profit margin.

The above costs were converted to U.S. cents at 9 Turkish lira per dollar. Converted at 12 lira per dollar, the rate prevailing after August 10, 1970, costs in U.S. cents would be 25-percent lower. No doubt many of the costs in Turkish lira will rise as the effect of devaluation is felt. For instance, an increase in the cost of picking cotton in terms of Turkish money is expected in 1971, which may leave the cost slightly higher in cents than before.

Competition from other crops

Cotton competes with numerous other crops in the regions where it is grown. In the Cukurova region taken as a whole, the principal other crops, acreagewise, are wheat, barley, oats, and sesame, while around Izmir, the principal other crops are wheat, barley, tobacco, and grapes. Cotton is the leading crop grown on irrigated land in these areas, but other important irrigated crops include sugarbeets, sunflowers, pulses, citrus, other fruits, and vegetables.

Mexican wheat.—The recent introduction of Mexican wheat has major implications for cotton because it grows well in cotton-producing zones and can absorb relatively large acreages without greatly depressing prices, such as would happen were as large an acreage planted to some vegetable crops. Yields from the new varieties of wheat are sufficiently greater than from traditional varieties to alter the normal income relationships between wheat and cotton. But they do require greater attention to proper amounts of plant food and moisture and more precise farming.

Wheat is planted in the late fall and grown through the winter and spring. It thus takes advantage of the winter rainfall pattern prevailing in much of Turkey and even in irrigated areas often needs no irrigation. Cotton, on the other hand, is planted in the spring and must endure through the hot, dry summer so that irrigation is highly beneficial.

Before the introduction of Mexican wheat, acreages planted to both cotton and wheat in cotton-producing zones were more or less stabilized. The net income from cotton was much higher than from native wheat on irrigated land and about equal to native wheat on unirrigated land.

This relationship between wheat and cotton changed quite dramatically beginning with the large-scale introduction of Mexican wheat in Turkey in 1967, when nearly 19,000 tons of seed were planted on approximately 420,000 acres, largely in the Cukurova, Aegean, and Marmara regions.[6] Average yields of Mexican wheat this first year were between 3,000 and 3,600 pounds per acre, compared with 900 to 1,300 for native varieties.

The Mexican wheat acreage was expanded rapidly until in 1969-70 there may have been as much as 2.0 million acres in the coastal regions of Turkey, and practically all wheat planted there was of the new varieties. At the same time, acreage planted to cotton was reduced substantially. The decline of one-third in cotton acreage in the Cukurova area, primarily in rain-grown cotton in 1970, was largely attributable to Mexican wheat.

But as the Mexican wheat area was expanded, use was made of less productive land and there may have been less careful attention on the average paid to plant food, moisture, and precise farming methods. Yields of Mexican wheat in relation to cotton were not as satisfactory as originally expected, and net returns declined. Heavy rains in the Izmir region in early 1970 ruined the wheat crop and caused a considerable recovery in cotton plantings later in the spring. Then devaluation in August 1970 in Turkish lira elevated cotton prices considerably, while the price of wheat was kept unchanged by Government action. As a consequence, a considerable recovery in cotton acreage in the Cukurova area is expected in 1971, while acreage in the Aegean area should show a moderate gain.

Cost studies made in Denizli Province (Aegean region) indicated that irrigated cotton gave a considerably higher gross value per acre than Mexican wheat in 1967 and 1968. The cost per acre of producing cotton, however, was at least double the cost of producing Mexican wheat, so that the net return from Mexican wheat was at least competitive with the return from cotton and at times considerably larger. But in 1969, when weather conditions and perhaps other factors caused a considerable decline in Mexican wheat yields, net returns no doubt were below those obtained from irrigated cotton (see following table and Appendix Table 4). The studies also showed, however, that the net income from the new wheat was far more attractive than from cotton in rain-grown areas.

An analysis of cost data indicates that labor costs, largely for hired labor, averaged $46 per acre of irrigated cotton, compared with only $4.50 for Mexican wheat (at 9.00 lira per dollar). In practice, farmers generally hired most of their labor, as evidenced by the fact that only $7.50 of the $46.00 in total labor costs for growing cotton represented family labor, while $38.50 represented hired labor.

It follows that if a cotton farmer had enough family labor to do all of the work he would have come out better financially by growing cotton instead of Mexican wheat, unless there was a satisfactory alternative use for the family labor that would have been released by shifting to wheat. Typically, however, the family labor supply is not this abundant, which explains the appeal of Mexican wheat as a competitive crop in areas where drainage is adequate to permit winter cropping with some degree of safety.

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[6] L. M. Humphrey, *Mexican Wheat Comes to Turkey*, U.S. AID/Turkey, April 1969.

Comparative returns, cost of production, and net income from cotton, Mexican and local-variety wheat, tomatoes, and alfalfa in Turkey

Item	Total value of production	Cost of production	Net income to land and management	Yield
Denizli Province, Aegean region:				
All farms in study:[1]	*Dollars per acre*	*Dollars per acre*	*Dollars per acre*	*Pounds per acre*
Cotton, 1967	192.00	116.01	75.99	[3] 668 [4] 1,740
Cotton, 1968	163.23	103.42	59.81	[3] 602 [4] 1,561
Mexican wheat, 1968	132.20	50.81	81.39	3,248
Local-variety wheat, 1968	66.10	30.58	35.52	1,401
Mexican wheat, 1969	84.08	55.75	28.33	2,025
One-third of farms with highest yields:[2]				
Cotton, 1967	273.39	138.94	134.45	[3] 949 [4] 2,471
Cotton, 1968	231.12	125.00	106.12	[3] 906 [4] 2,346
Mexican wheat, 1968	186.60	58.45	128.15	4,639
Local-variety wheat, 1968	96.67	32.37	64.30	2,043
Cukurova region: cotton, unirrigated, 1968[5]	59.80	44.96	14.84	[3] 205 [4] 535
Tarsus: tomatoes, 1968	341.73	236.06	105.67	–
Coastal areas generally:[5]				
Alfalfa, irrigated, 1968	188.85	67.45	121.40	–
Alfalfa, unirrigated, 1968	121.40	40.47	80.93	–

[1] Converted at 9.00 lira per dollar. [2] From T. C. Tarim Bakanligi, Denizli Ilinde Pamuk, Meksika Bugdayi Cesitleri Ve Akbasak Bygdayinin Mukayeseli Ekonomik Analizi, 1968-69, Ankara 1969. [3] Lint cotton. [4] Seed cotton.
[5] From Tarsus Agricultural Experiment Station and Vegetable Section, Ministry of Agriculture, Ankara.

While much depends on weather conditions each year and on comparative prices and other factors, the experience of the past few years indicates that Mexican wheat will continue to provide very strong competition for cotton on unirrigated land and will continue to make some inroads into irrigated acreage on many individual farms, particularly if the land is well drained. It is unlikely to make much headway where the water table is high and winter waterlogging is a problem.

Research is now underway to determine what crops can profitably follow wheat as a second crop. In this connection, it was found that interrupting continuous cotton cropping with wheat had a salutary effect on cotton pests, weeds, and soil deterioration. Some experts are of the opinion that a rotation involving both wheat and cotton will become increasingly important in the future. Total cotton production may not suffer inasmuch as cotton will tend to be concentrated on high-yielding irrigated acreage, and yields also may benefit from any increase in rotation. Also, cotton will benefit from the expansion of irrigation in areas where cotton is a prime competitor for land.

Over a longer period of time, policy problems could arise that—depending upon how they are resolved—could affect relative acreages of cotton and Mexican wheat. At present, Turkey depends on imports for roughly 10 percent of its domestic consumption of wheat. Should Mexican wheat become a major factor in the Turkish wheat economy, perhaps even throwing Turkey into a wheat export position, the Government might have to weigh the cost of maintaining as high a level of price support for high-yielding Mexican wheat—grown in rich coastal irrigated areas where many alternative crops are available—as it maintains for wheat in dryland areas on the Anatolia Plateau and elsewhere where there are few, if any, alternatives to growing lower yielding native varieties of wheat.

Other crops.—A study by the OECD covering the year 1967-68 indicated that citrus, other fruits, potatoes, vegetables, and melons under ideal irrigated conditions and at good prices can provide at least double the value per acre obtained from cotton yielding 1,000 pounds per acre. Values from rice were somewhat higher; values from sugar beets and fodder crops, roughly comparable; and values from sunflower and corn, considerably lower. Most of the other competitive crops, however, were subject to much wider price variations than was cotton and at lower prices and minimum yields did not provide as good a value per acre. This was without regard to the cost of production.

World Bank studies of the Cukurova area indicate, as noted in the section on irrigation, that as irrigation becomes available to more and more land under the Seyhan Project, total cotton acreage, formerly largely rain-grown, would shrink to a much smaller acreage, practically all irrigated. While cotton would remain the most important crop, there would be increasing acreages of fruit, largely citrus, vegetables, oilseeds, melons, and other crops. Such changes already are in evidence, and there appears to be considerable local opinion that this trend will continue. Marketing and transport facilities to ship such products to Europe are gradually developing.

Citrus is considered to be more profitable than cotton, but it requires a large investment and a waiting period of several years before providing a return. As the data in the preceding table indicated, good returns can also be obtained from tomatoes and alfalfa.

Cotton also is likely to feel increased competition from fruits and vegetables in the Aegean area. In both regions, however, it is well to recognize that the shift of even a few thousand acres from cotton to a vegetable or fruit crop may make a major change in the total supply and demand picture for the particular specialty crop without exerting much of an influence on the cotton situation. Thus, while such crops may bring very high profits in some years and even good profits over any reasonable timespan, they can also result in heavy losses in individual years.

Sugarbeets also normally give higher net returns than cotton, but the acreage farmers can plant is limited by the capacity of existing sugarmills at any given time. Some new mill capacity may be added in existing cotton areas in the years ahead, but the total impact of this development on cotton acreage is unlikely to be sizable.

Policy and research

Government agricultural policies are incorporated into the second 5-year plan, which began in 1968. The main point under this plan is to raise production to 2.1 million bales of lint cotton from the 1967 level of 1.8 million bales, both to meet higher domestic demand and to expand exports under a relatively free market structure. This objective is to be gained by an expansion of agricultural education, training, and research; introduction of improved farming techniques; standardization of farm products; greater use of irrigation, fertilizer, and pesticides; the encouragement of more owner-operator farming units; and other means.

Acreage is projected at nearly 1.9 million acres for 1973, compared with 1.7 million in 1967, and yields are projected at 540 pounds per acre compared with 461 in 1967. It might be noted that in 1970 acreage was only 1,304,000 acres, the yield, 643 pounds, and production, 1,837,000 bales.

While these policies are directed toward agriculture in general, the Turkish Government aids the raw cotton industry, specifically, through agencies within the Ministry of Agriculture and the Ministry of Commerce.

The Ministry of Agriculture has many functions related to cotton. The Cotton Department, in addition to handling research on cotton improvements, renders technical assistance to producers and conducts demonstrations for them. The Agricultural Combat and Quarantine Administration aids cotton producers in controling insects and disease, while the Soil and Water Administration manages national irrigation projects. Farm level education is handled by the General Directorate of Agriculture. Seed and machinery are supplied in part by the Agricultural Machinery and Implements Corporation and in part by private companies. Several large national farms produce certified planting seed for distribution to farmers.

In the Ministry of Commerce, the Standards Department establishes legal standards for baled cotton and enforces compliance with the regulations. The Department of Foreign Trade adopts policies on exports, and compiles and distributes foreign market information.

Under direction of the Ministry of Agriculture, research on cotton problems is carried on in all of the major cotton areas and some minor ones. Cotton improvement research involves intensive work in cotton breeding, selection, and multiplication, with apparently less attention to work on cultural practices, water use, and mechanization. Considerable fiber-testing equipment is available for the determination of various quality factors in lint, even though these factors are for the most part disregarded in domestic commercial transactions.

PROCESSING AND MARKETING

Ginning and packaging

Practically all of the cotton in the Aegean and Antalya areas and about 50 percent of that in Cukurova is roller ginned. The remaining 50 percent in Cukurova is saw ginned. Mill men and exporters have mixed opinions concerning the relative merits of the two methods. Some mill men prefer saw-ginned fiber because it is cleaner, while others choose roller-ginned cotton because the fiber shows less damage. Generally, exporters want to maintain their market for roller-ginned fiber; although price discounts for roller-ginned qualities are sometimes needed to make sales. The discounts reflect the higher trash content of the roller-ginned cotton.

In 1968—latest date of official statistics—there were 642 roller gins, with 8,404 stands, in Turkey, and 34 saw gins, with 103 stands (see Appendix Table 5). The latter includes several high-capacity saw gins. Compared with data for 1961, the number of roller gins has been reduced, but the number of stands has increased both in total and on the average. Conversely, the number of saw gins has increased, while the number of stands has declined, but because of greater use of high speed equipment, it is believed that ginning capacity is somewhat larger than before.

A national law requires that ginning must be completed by the end of March each year, but small quantities of pressing continue through the season. Since there are only 406 gin presses, substantial quantities of cotton lint are moved to other gins for baling.

It is estimated that around 10 percent of Turkish cotton is never baled. Some gins owned by cotton mills buy cotton directly from farmers or grow it themselves, keeping it for their own use. They gin the cotton and hold it in unbaled form until needed.

Several specifications of bales as to size and density have been used in Turkey, with gross weights ranging from 420 to 540 pounds, and densities, from 18.3 to 41 pounds per cubic foot. A few years ago, the Turkish Standards Institute established standard specifications for roller-ginned bales, and it is reported that three-fourths of such bales now meet the new standards.

The new bale has dimensions of 65 x 95 x 105 centimeters (about 26 x 37 x 41 inches) and a gross weight of between 190 and 200 kilograms (419 to 441 lb.). The jute covering and ties weigh about 4.5 kilograms (10 lb.). Such a bale would have a calculated density of around 20 pounds per cubic foot, compared with 23 for U.S. standard-density domestic bales and 33 for U.S. high-density export bales.

Turkish saw-ginned bales are reported to weigh 200 to 220 kilograms net (440 to 485 lb.).

A recent visit to a leading world cotton-importing center, where cotton from many countries is received, indicated that packaging of cotton in Turkey now compares quite well with bales from other countries. The Turkish cotton had an underlayer of plastic sheeting and an outerlayer of burlap, with the official Turkish grade stenciled on the burlap.

Some of the larger cotton producers have their cotton custom ginned at rates ranging from 55 to 60 kurus per kilogram of lint (2.8 to 3.0 cents per lb.), including baling, for roller ginning and 50 to 55 kurus (19-21 cents per lb.) for saw ginning. The lower rates are generally those charged farmers with larger volumes.

Most of Turkey's cotton, however, is sold unginned. The seed cotton is delivered to the ginyard where it is sorted into two or three grades and stored with other cotton of the same quality. The grade of the unginned cotton is determined on the basis of color and foreign matter.

In years when market prices are well above support levels the farmer usually sells his cotton directly to the gin, although some farmers sell all or a part to other buyers, and still others retain their lint, either after pressing or else unpressed after ginning, if the ginning is done at a gin without a press. Such cotton is then custom baled at another gin before being sold by the farmer.

Cotton quality and grades

Turkey produces a small amount of Yerli cotton which falls in the short staple category with staple lengths of 11/16" to 7/8". Hardly any U.S. cotton is in this category. Other than that, Turkish cotton is almost completely in the medium-long staple range of 1-1/32" - 1-3/32", in which nearly two-thirds of world cotton production falls, including most of the cotton grown in the United States. And it is in this staple length group that the largest number of cotton exporting countries, more than 40, compete in world markets.

While modern ways are taking hold in Turkey, camels are still seen moving cotton to market, below, as are wagons, such as this one, at right, in the streets of Adana.

The micronaire of Turkish cotton customarily ranges from 3.5 to 5.0, which is quite comparable to the values for U.S. upland cottons. Pressley breaking strengths seem to range from 78,000 to 90,000 pounds per square inch, which again is comparable to readings for U.S. varieties generally, excluding the high strength U.S. Acala and similar varieties.

Samples of Turkish cotton, obtained from European spinning mills a few years ago, were found by official U.S. cotton classers to class mostly as Strict Low Middling White and Light Spotted and Middling Light Spotted 1-1/32" to 1-3/32", according to U.S. official standards. Laboratory tests indicated that the Turkish cotton was comparable to U.S. cotton in length uniformity, micronaire and fiber strength but that the Turkish samples had a much higher nonlint content and produced much more picker and card waste than American samples of the same grade. On the other hand, Turkish cotton was decidedly superior in lack of neps.[7]

The Ministry of Commerce of Turkey is responsible for the classification of ginned cotton into grades which, like the U.S. official cotton standards, take into account color, foreign matter, and preparation. But there are separate standards for (1) roller-ginned Aegean cotton, which includes cotton from both the Aegean and Antalya regions; (2) roller-ginned Cukurova cotton, which includes cotton from both the Cukurova and eastern areas; and (3) saw-ginned cotton, all of which comes from the Cukurova region.

Since the seed cotton is sorted before ginning into lots of more or less the same quality, the classers do not class each bale of cotton. Rather, large samples are drawn from 5 to 20 percent of the bales, from what is thought to be an even-running lot, and the classification of the whole lot is based on the results of the subsample. Statistics indicating the grades of the three groups of Turkish cottons are given in the following table.

It will be noted that Standard I White is the most important grade in each of the three groups. This is true also of the cotton exported although there is no way of knowing whether the exporters in declaring the quality of the cotton exported always apply the same standards as the official classers.

Samples of Cukurova Standard I roller ginned cotton obtained in a European import market in 1970 were rated by U.S. official classers as Low Middling Light Spot and Strict Low Middling Light Spot 1-1/16". Samples of Aegean Standard I r.g. cotton were found to be of the same grade but 1-5/32" in staple length while Standard I r.g. cotton from Antalya was rated as Middling Light Spot 1-1/8"

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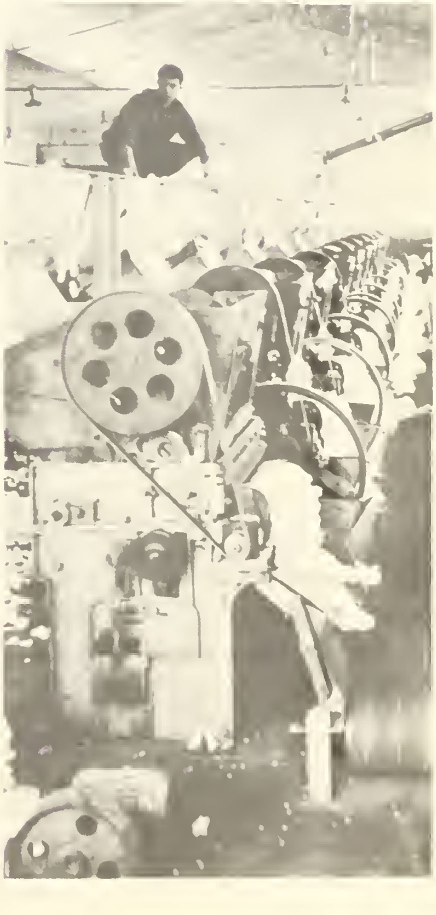
[7] T. L. W. Bailey, Jr., and Robert B. Evans, *A Comparison of the Quality of Foreign and United States Upland Cottons as Indicated by Fiber and Spinning Tests*, Foreign Agriculture Circular FC 8-69, USDA, Washington, D.C., May 1969.

Upon arrival at the gin, sacks of cotton are unloaded (above) and then weighed (below) and fed into gin through suction pipes (right).



Far right, inside a roller gin—in Turkey the most often used method of separating the lint from the seed. Right, bales of the finished cotton emerge from gin.

Classification of Aegean and Cukurova roller-ginned and saw-ginned cotton in Turkey according to Turkish official standards

	Roller-ginned cotton						Saw-ginned cotton		
	Aegean			Cukurova					
	1967-68	1968-69	1969-70	1967-68	1968-69	1969-70	1967-68	1968-69	1969-70
White standard:	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Extra	0.5	0.1	0.1	6.6	5.8	2.9	30.2	11.1	10.4
1	53.0	34.6	65.3	78.2	25.1	64.7	52.0	40.6	50.2
2	12.7	19.3	6.9	7.2	27.7	10.7	11.4	26.9	25.0
3	3.3	6.1	1.5	.5	3.1	.3	1.6	8.2	2.0
4-6	1.5	.7	–	–	.2	–	.2	.3	–
Light spotted standard:									
1	13.2	19.2	15.8	5.4	22.2	14.8	2.4	4.6	5.9
2	10.1	13.8	7.4	1.6	12.3	6.2	1.4	6.7	4.7
3	3.9	4.0	2.3	.5	3.1	.4	.3	1.3	.7
4-5	1.7	2.0	.4	--	.5	–	--	–	--
Colored standards 1-5	--	--	--	--	--	--	.5	.3	1.1
Other	.1	.2	.3	-	--	--	--	--	--
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Statistics of the Standardization Section, Ministry of Commerce, Turkey.

Cotton exports by grades from Turkey

Item	1967	1968	1969	January-July 1970
	1,000 bales	*1,000 bales*	*1,000 bales*	*1,000 bales*
Short staple cotton 55.01.10	4	(1)	–	–
Medium staple cotton:				
Aegean Standard Extra 55.01.21	6	11	11	1
Aegean Standard I White and Light Spotted 55.01.22	442	500	379	397
Aegean Standard II White and Light Spotted 55.01.23	184	119	152	84
Cukurova Standard I White and Light Spotted 55.01.24	234	202	132	121
Cukurova Standard II White and Light Spotted 55.01.25	11	21	40	17
Other medium-staple cotton 55.01.29	139	171	222	167
Long-staple cotton 55.01.30	5	5	(1)	–
Cotton linters 55.02.00	114	130	140	100
Cotton, carded or combed 55.04.00	(1)	–	(1)	–
Grand total	1,139	1,159	1,081	887

[1] Less than 500 bales.

Source: State Institute of Statistics of Turkey.

Within the narrow staple length and grade classification in which most Turkish cotton is available, this cotton is available in both irrigated and rain-grown cottons either roller-ginned or saw ginned.

Domestic and export prices

The Government of Turkey intervenes in the price of Turkish cotton in several ways, including: (1) providing support prices for raw seed cotton; (2) setting special export incentives or exchange rates for cotton; (3) setting minimum dollar export prices; and (4) concluding bilateral agreements that facilitate movement of Turkish cotton to Eastern Europe and the USSR.

Turkish Government floor prices for Standard I unginned seed cotton as offered to members of cooperatives[1]

Crop year beginning August 1	In Turkish money			Equivalent in U.S. money[2]		
	Cukurova	Aegean	Antalya	Cukurova	Aegean	Antalya
	Kurus per kg.	*Kurus per kg.*	*Kurus per kg.*	*Cents per lb.*	*Cents per lb.*	*Cents per lb.*
1966	205	220	210	10.3	11.1	10.5
1967	220	225	225	11.1	11.3	11.3
1968	230	235	235	11.6	11.8	11.8
1969	225	235	235	11.3	11.8	11.8
1970:						
August	280	(3)	280	10.5	(3)	10.5
September	295	(3)	300	11.2	(3)	11.3
1971	297	312	307	11.2	11.8	11.6

[1] Cukobirlik Regional Cooperative Union in Cukurova, Taris in Aegean area and Antibirlik in Antalya. The floor price offered to nonmembers was 10 lira lower in 1966, 5 lira lower in 1967-69, and 17 lira lower in 1971 than the prices shown. [2] Converted at 9 lira per dollar in 1966-69; 12 lira in 1970-71. [3] Not available.

For some years Turkey has utilized support prices for raw seed cotton. The present system started with the 1966 crop. In each of the three major producing zones the Government announces the level of seed cotton prices at which each Regional Cooperative Union will receive cotton from members and nonmembers. When world prices are well above support levels, cotton flows easily into normal marketing channels—private firms or cooperatives, depending upon the farmer's choice—but when this is not the case there is an extra incentive for farmers to market their cotton through the cooperative in order to take advantage of their support price function. The proportion of the crop handled by cooperatives was rising steadily until 1970-71 when a much higher proportion was handled by private firms than in the previous season owing to higher market prices.

Farmers, however, do not always take advantage of the support price, even when it is higher than the market price. At the height of the harvest in the fall of 1969 numerous cooperative members were selling seed cotton to private ginners at a half cent a pound below the support level. The reason was that with long lines of trucks were waiting to be unloaded at the cooperatives, a truck could make only about two trips there a day, compared with four or five trips to private gins where waiting lines were nonexistent or less of a factor.

Under the circumstances, farmers felt that the higher cooperative support price was not worth the added risks and effort of first stacking the cotton on the ground and then loading it when trucks became available. As a consequence, a sizable portion of the crop moved into channels of trade at prices somewhat below the official support levels.

In this connection, it should be noted that the cooperatives typically do all they can in such situations to fulfill their responsibilities to farmers, the Government, and the cotton trade. In years when they realize that they are likely to handle an abnormally large part of the crop, they contract with a number of privately owned gins to handle cotton for the cooperative to the extent of their full capacity, or to some agreed-upon portion of their capacity. This type of arrangement provides farmers with a large number of delivery points at which cotton is purchased at the support price, facilitates the ginning of the crop in a shorter period, and results in private gins being used more efficiently than would otherwise be the case.

There are active spot cotton exchanges in both Adana and Izmir. Cotton is typically sold through the exchanges in truckload lots by farmers who have their cotton custom ginned and by ginners and others who may have bought seed cotton from farmers and had it ginned. Purchasers include exporters, domestic mills, and cotton merchants, who in turn sell to local mills, exporters, or foreign customers. The regional cooperatives do not offer their cotton through the exchanges but sell directly to local mills, merchants, exporters, or foreign buyers.

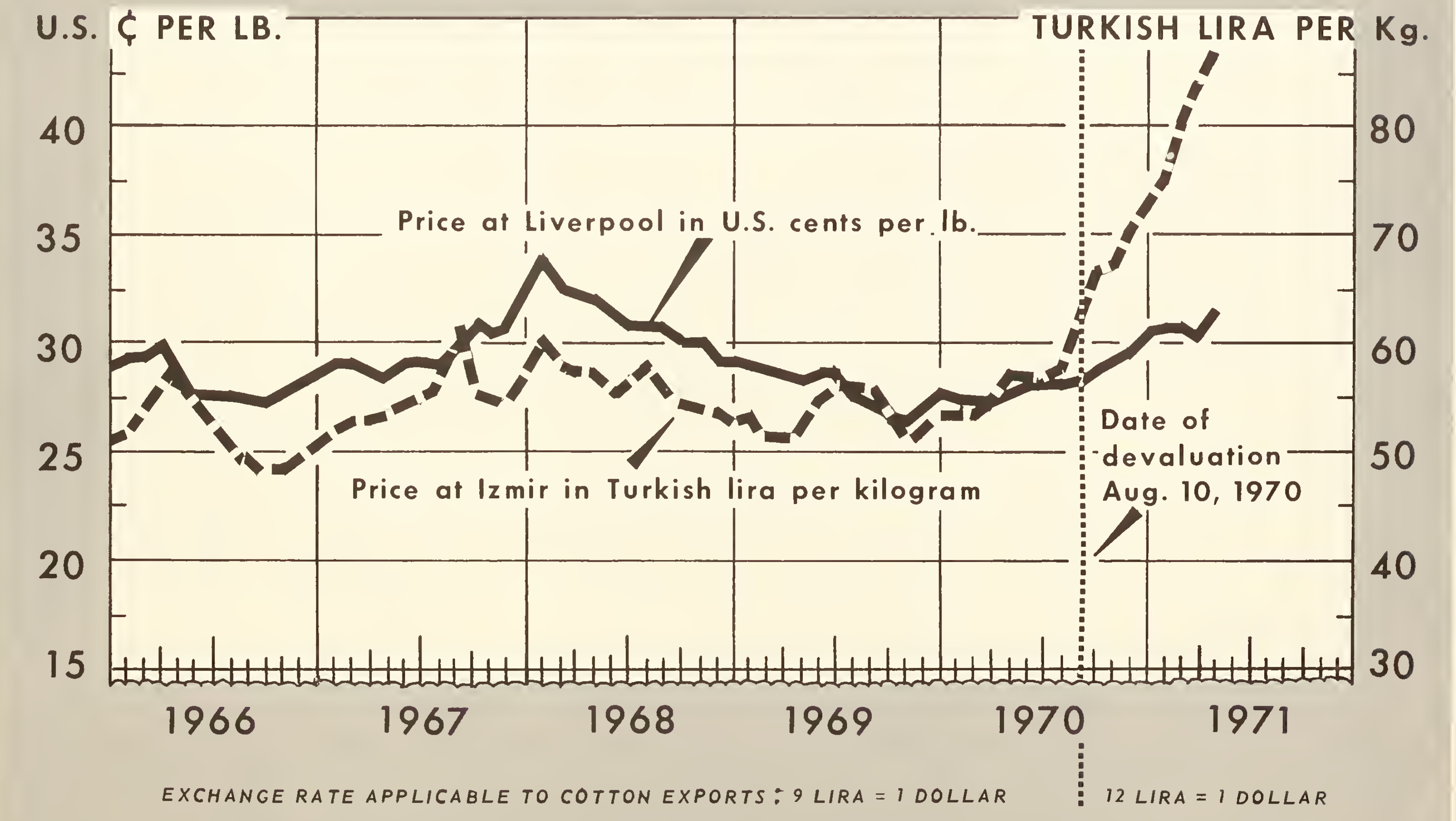
The price of Turkish cotton, both internally and externally, is affected by tax rebates and the exchange rate.

To help promote exports, the Government of Turkey introduced a so-called tax rebate of 3 percent on exports to hard currency countries in 1968-69. The tax rebate was, in fact, a direct subsidy payment made on the f.o.b. value of export sales. This rebate however, failed to bring the desired level of cotton exports and was therefore increased in 1969-70 to 10 percent, which made it possible for export prices to be lower than local prices.

On August 10, 1970, the Turkish lira was devalued from the old parity of 9.00 to the dollar to a new general rate of 15.00 to the dollar, but only 12.00 lira to the dollar was authorized for cotton exports. Although the former

HOW DEVALUATION OF THE LIRA AFFECTED TURKISH COTTON PRICES

(Izmir Standard I White Cotton)



10 percent export rebate on cotton was eliminated, the new rate was the key factor in rapid rise in local prices for cotton in Turkish lira. It should be noted, however, that cotton prices on the world market also rose during this period. In any event, by January 1971, the internal price of cotton, in Turkish lira, was 40-percent higher than that of a year earlier (see Appendix Table 6).

There is still the possibility that the exchange rate applicable to cotton exports might be increased further in the future from the present special level of 12.00 to the dollar to the general rate of 15.00 if the Turkish authorities consider that the cotton situation warrants such a change.

Under a program launched in 1970 by the Ministry of Commerce, cotton exports are subject to minimum export prices agreed upon by the Izmir Exporters Union and the Cukurova Cotton Exporters Association, as well as to registration. Minimum prices announced in the spring and summer of 1970 for the coming 1970 crop ranged from 23 cents to 26.3 U.S. cents per pound, f.o.b. net, depending on where the cotton was grown, its grade, and whether saw ginned or roller ginned.

In November 1970, however, the minimum export price was set as (a) the higher of a fixed minimum price—at first 26.50 cents for Aegean Standard I r.g., but by March 1971, 29.5 cents—or (b) the 3-day average Adana or Izmir exchange price plus 1.0 cents per pound for f.o.b. costs. Under this new system, the minimum export price for Aegean Standard I cotton was advanced from 28.2 cents per pound in November 1970 to 31.2 cents in February 1971.

The price situation of Turkish cotton also is influenced by bilateral agreements which permit the movement of cotton in other than hard currencies. Around 20 percent of Turkey's total exports of all products and commodities moves under bilateral clearing agreements, mainly with the Eastern European Countries and the USSR. Cotton is an important commodity in these agreements. In 1969-70 clearing agreements called for an export of 138,000 bales, with 114,500, or 10 percent of Turkey's total cotton exports, actually shipped. A slightly larger export is contemplated in 1970-71, but from August through December 1970 only 35,000 bales had moved.

In the last few years, Turkish cotton generally has sold at 1 to 2 cents per pound below the price of U.S. cotton of comparable quality in West European markets although U.S. cotton at times has been temporarily fully competitive. This situation reflects, among other things, the fact that U.S. cotton, with fixed minimum support prices, has often been priced above the prevailing market level for cotton.

Import prices for Turkish cotton fell to the lowest level in many years in 1969-70 but recovered considerably in 1970-71, owing largely to reduced worldwide supplies of cotton.

Trade protocols involving cotton between Turkey and bilateral clearing agreement countries[1]

Country	1969-70		1970-71	
	Protocol quantity	Actual cotton exports[2]	Protocol quantity	Actual cotton exports, August-February only
	1,000 bales	*1,000 bales*	*1,000 bales*	*1,000 bales*
USSR	16.1	13.1	13.8	9.5
Czechoslovakia	18.4	17.6	23.0	19.0
Romania	13.8	10.2	13.8	7.5
Hungary	27.6	30.9	32.2	30.9
Poland	23.0	19.1	23.0	8.3
Germany, East	16.1	7.5	13.8	0
Bulgaria	9.2	3.5	9.2	2.9
Yugoslavia	13.8	12.6	18.4	10.7
Total	138.0	114.5	147.2	88.8

[1] There also was a protocol with Albania, calling for $500,000 worth of cotton in both years, but it is not known whether any cotton was sold under it.

[2] August-July.

C.i.f. offering price quotations for Turkish cotton, Liverpool, England

Year beginning August 1	Turkish	
	Adana Standard I	Izmir Standard I
	Cents per pound	*Cents per pound*
1960	28.21	30.72
1961	28.24	30.58
1962	26.86	29.69
1963	27.01	29.57
1964	26.53	29.81
1965	25.48	28.83
1966	25.70	28.25
1967	29.48	31.46
1968	26.58	29.12
1969	25.43	27.45
1969:		
August	24.56	27.22
September	24.00	26.62
October	23.72	26.30
November	24.65	26.95
December	25.67	27.75
1969-Continued:		
January	25.60	27.50
February	25.59	27.50
March	25.81	27.40
April	26.00	27.78
May	26.50	28.32
June	26.50	28.14
July	26.59	27.94
1970:		
August	26.78	28.06
September	27.21	28.62
October	27.56	28.87
November	28.30	29.36
December	29.00	30.75
January	29.00	30.92
February	28.75	30.88
March	29.12	30.52
April	29.43	31.07

[1] Quotations for prompt shipment when available; otherwise shipped within 3 months.

[2] Year beginning August 1.

Source: Liverpool Cotton Services, Limited, Liverpool, England.

Raw cotton exports

As noted at the beginning of this report, cotton is a major source of foreign exchange for Turkey, earning in excess of $100 million a year. At the same time, Turkey is a major competitor among cotton-exporting countries, being outranked only by the United States, the USSR, Mexico, the UAR, and Brazil. In most recent years, exports have accounted for 50 to 60 percent of total production (see table on page 3).

In pre-World War II years, and, in fact, until the late 1940s, Turkish exports of cotton stayed below 100,000 bales per year. Exports then rose to an average of 331,000 bales during the first half of the 1950s, only to fall off to 246,000 bales during the last half as a result of domestic mill consumption rising at a much faster rate than production. The situation has since reversed: in the first half of the 1960s, exports averaged 534,000 bales per year, and in the last half, 1,012,000. The peak year was 1966-67 when exports totaled 1,049,000 bales.

In recent years, about 70 percent of Turkey's cotton exports have moved to markets in Western Europe. Leading markets in 1969-70 were West Germany, 157,000 bales; Switzerland, 124,000; the United Kingdom, 116,000; and Italy, 102,000. Other markets taking 50,000 bales or more were Lebanon, 99,000 bales; France, 98,000; Belgium. 78,000; and Japan, 70,000. Exports to Eastern Europe have increased rapidly in the last few years from an average of 35,000 bales in 1960-64 to over 100,000.

Turkish cotton leaders—both inside and outside of Government—are keenly aware of the role of cotton exports in the economy of Turkey. Consequently, appropriate steps have been taken as necessary to ensure that Turkish cotton can move effectively in foreign trade channels, as discussed in the section on prices.

Private firms have handled about three-fourths or more of the cotton export trade in recent years. They also supply much of the cotton for domestic mills. During the ginning season, private cotton firms that do not own gins of their own characteristically buy cotton as it is offered for sale through the cotton exchanges. Other than in the ginning season, they may also buy cotton on a bid basis from the Regional Cotton Cooperative Unions—Taris, Cukoberlik, and Antberlik. The Cooperative Unions also make direct sales to domestic mills and foreign buyers. In practice, the cooperatives often refrain from selling cotton when private firms are most active in the market, thereby tending to bolster prices.

Exports of cotton from Turkey by country of destination

Country	Year beginning August 1						
	Average			1967	1968	1969	1970[1]
	1955-59	1960-64	1965-69				
European Community:	*1,000 bales*[2]	*1,000 bales*[2]	*1,000 bales*[2]	*1,000 bales*[2]	*1,000 bales*[2]	*1,000 bales*[2]	*1,000 bales*[2]
Belgium	10	60	81	68	78	78	74
France	42	24	62	53	40	98	94
Germany, West	50	91	126	152	108	157	156
Italy	76	117	109	92	112	102	69
Netherlands	4	6	28	18	33	69	47
Total	182	298	406	383	371	504	440
Other Western Europe:							
Austria	1	1	2	2	3	4	1
Finland	5	5	3	0	0	13	1
Greece	0	6	20	3	45	12	5
Portugal	0	39	38	29	43	32	17
Spain	0	3	26	18	16	12	7
Sweden	2	1	2	5	(3)	(3)	(3)
Switzerland	2	22	105	132	86	124	155
United Kingdom	29	96	142	158	94	116	73
Total	39	173	338	347	287	313	254
Eastern Europe:							
Bulgaria	1	3	6	7	4	4	3
Czechoslovakia	6	8	15	14	13	18	19
Germany, East	1	1	10	9	7	7	0
Hungary	3	7	25	19	25	31	31
Poland	1	8	21	22	23	17	8
Romania	2	2	14	25	19	10	7
Yugoslavia	2	6	13	4	24	21	11
Total	16	35	104	100	115	108	79
USSR	0	0	10	11	16	9	9
Asia and Africa:							
China, Mainland	0	2	6	7	2	7	0
China, Taiwan	0	3	11	(3)	9	14	0
Israel	5	10	5	5	6	1	(3)
Japan	3	1	56	114	22	70	57
Lebanon	1	12	78	64	119	99	82
Canada	0	0	3	(3)	1	9	0
Pakistan	0	0	2	3	0	0	8
Total listed countries	9	28	162	193	159	200	147
Others	0	0	0	6	5	4	2
Grand total	246	534	1,020	1,040	953	1,138	931

[1] August-February only.

[2] 480 lb. net.

[3] Less than 500 bales.

COTTON CONSUMPTION

Turkey has made very considerable progress in increasing the supply of textiles to its own population in recent years. On a per capita basis, the consumption of all apparel fibers (mill consumption corrected for exports and imports of textiles) rose from 9.3 pounds in 1954 to 12.6 in 1964, 14.5 in 1967, and an estimated 14.6 in 1969. The 1967 figure was higher than the world average of 13.2 pounds and neighboring Syria's average of 12.3 pounds. It was

Mill consumption of cotton, wool, and manmade fibers in Turkey

Calendar year	Cotton	Wool	Rayon	Other manmade fibers	Total
Quantity:	*Millions pounds*	*Million pounds*	*Million pounds*	*Million pounds*	*Million pounds*
1960	238.1	57.1	4.0	(1)	299.2
1961	241.4	57.1	2.6	(1)	301.1
1962	247.8	57.1	8.2	(1)	313.1
1963	267.2	54.4	17.0	7.5	346.1
1964	291.7	50.7	18.1	7.9	368.4
1965	303.8	53.1	17.9	11.7	386.5
1966	314.6	61.0	21.2	15.2	412.0
1967	334.2	61.1	32.6	25.8	453.7
1968	362.7	58.0	24.9	25.3	470.9
1969	385.1	58.4	20.5	54.7	518.7
Share: :	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
1960	79.6	19.1	1.3	(2)	100.0
1961	80.2	19.0	.8	(2)	100.0
1962	79.2	18.2	2.6	(2)	100.0
1963	77.2	15.7	4.9	2.2	100.0
1964	79.2	13.8	4.9	2.1	100.0
1965	78.6	13.7	4.7	3.0	100.0
1966	76.4	14.8	5.1	3.7	100.0
1967	73.7	13.5	7.1	5.7	100.0
1968	77.0	12.3	5.3	5.4	100.0
1969	74.2	11.3	4.0	10.5	100.0

[1] Less than 500,000 pounds.   [2] Less than 0.5 percent.

Source: International Cotton Advisory Committee, *Cotton-World Statistics,* July 1970; 1969 from manuscript data.

Turkish spindle and loom numbers and production and exports of cotton yarn and fabrics

Item	Calendar years						
	1950	1955	1960	1965	1967	1968	1969
	Thousands	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*
Spindles in operation	276	536	793	966	1,053	1,102	1,545
Looms in operation	(1)	[2] 6.2	15.8	20.1	20.3	20.7	20.8
Cotton yarn:	*Million pounds*	*Million pounds*	*Million pounds*	*Million pounds*	*Million pounds*	*Million pounds*	*Million pounds*
Production, state mills	36.6	56.9	60.8	70.8	75.6	81.6	81.8
Production, private mills	29.8	80.9	143.8	160.7	204.4	232.4	270.9
Total	66.4	137.8	204.6	231.5	280.0	314.0	352.7
Exports	(1)	(1)	(1)	(1)	.7	1.1	127.0
Cotton fabric:	*Million linear yards*	*Million linear yards*	*Million linear yards*	*Million linear yards*	*Million linear yards*	*Million linear yards*	*Million linear yards*
Production, state mills	144	209	220	198	207	229	220
Production, private mills	43	247	534	458	559	591	617
Total	187	456	754	656	766	819	837
Exports	(1)	(1)	(1)	23	2	17	30

[1] Not available.   [2] December 1952.

Compiled from Turkey's annual reports to the International Cotton Advisory Committee and the *Monthly Bulletin of Statistics of Turkey.*

about equal to Yugoslavia's 14.8 pounds but below the 19.8 pounds consumed in Greece, the 24.0 in Western Europe, and the 44.7 in the United States[8].

Turkey has insignificant imports and relatively small exports of textiles, so the quantity of fibers processed by mills into textiles is practically identical with the quantity ultimately used in the form of textiles by the people of Turkey. As indicated in the table on p. 28, mill consumption of textile fibers increased from 299.8 million pounds in 1960 to 518.1 million in 1969—an impressive gain of 73 percent.

Cotton is the dominant textile fiber used in Turkey, but its share of the market for apparel fibers declined from 80 percent in 1961 to 74 percent in 1969. In comparison, cotton supplied 38 percent of the fiber used in Western Europe, 43 percent of that used in the United States, and 57 percent of the world total in 1968.

Despite the moderate decline in the percentage of cotton used, consumption quantitatively has been rising quite rapidly. Only about 200,000 bales were consumed annually in the years immediately following World War. By the last half of the 1950s, the annual average had increased to 479,000 bales; in the early 1960s, to 522,000; and in both 1969-70 and 1970-71, to 800,000.

Consumption of wool, by comparison, has remained unchanged in the last few years. Consumption of rayon and acetate, never large, reached a peak in 1967 and has since declined. Consumption of synthetic fibers began to increase with the start of production in Turkey in 1964 and by 1969 accounted for 10.5 percent of the total mill consumption of apparel fibers. At present, Turkey has one plant producing viscose rayon, three producing polyester yarn or staple, two producing nylon 6, and one producing acrylic staple. Present plans call for a production capacity of 43.8 million pounds at the end of 1971, compared with an actual production of 18.0 million pounds in 1969[9]

The productive capacity of Turkey's textile industry has been greatly increased over the years. At the establishment of the Turkish Republic in 1923, there were only eight cotton-spinning mills with a capacity of 68,000 active spindles and 760 looms. By January 1950, there were 276,000 spindles, and by January 1967, a million. From 1967 to 1969, another half a million spindles were added. As for looms, Turkey has had between 20,000 and 21,000 looms since 1963, but the proportion of modern, high-speed equipment has been rising. In addition, there are about 15,000 hand looms scattered throughout the country. Since about 1950, Turkey has been self-sufficient in cotton yarn and textiles.

Turkey's textile industry was dominated for many years by Sumerbank, a Government organization that operates nationally owned textile mills, which comprised most of the industry prior to World War II. After World War II, the private sector was revived, and in 1950 and 1954 this sector gained additional momentum from laws that encouraged private investment. The development of private mills was encouraged also by Turkey's growing cotton production and favorable economic conditions. The result was a moderation of growth in Sumerbank's production of cotton yarn and cloth, contrasted with continuing rapid growth in output of private mills.

Of a total 1969 production of 35.3 million pounds of cotton yarn, more than three-fourths was produced by the private sector. Correspondingly, of 837 million linear yards of cotton cloth, slightly under three-fourths was so produced. Turkey's current 5-year plan calls for a production of 1,126 million linear yards of cotton cloth by 1972, which would represent an annual gain of 7.7 percent from 1967 to 1972. This is somewhat in excess of the actual gain from 1967 to 1969, which, nonetheless, totaled over 9 percent.

Sumerbank's textile output is mostly comprised of low-priced goods, which are sold at retail outlets operated in nearly every village and town. Sumerbank textiles also are distributed through private wholesalers and retailers. The organization now operates 12 cotton-spinning and weaving mills plus another three cotton-spinning mills. Production is centered mostly in the coarser medium counts of 16's to 24's. Sumerbank also is a joint owner with private interests of several other textile mills, and operates several cotton gins and Turkey's only rayon plant.

Around one-third of Turkey's cotton-spinning capacity, mostly privately owned, is located in the Cukurova region around Izmir, and another 27 percent, mostly Government-owned, is in the Aegean region, around Izmir. Still another 25 percent is in Istanbul, and the remaining 15 percent, largely Government-owned, in east-central Anatolia.

The Turkish Government, like many other countries, encourages the export of cotton in the form of textiles rather than in raw-fiber form, in order to provide more jobs within the country and earn more foreign exchange. While the hard currency earned from exporting raw cotton has been converted since August 1970 at a special rate of 12 lira to the dollar with no tax rebate, exports of cotton textiles have been converted at the general rate of 15 lira to the dollar and also benefit from a 30- to 35-percent tax rebate. It still is too early to determine whether exports of Turkish textiles will rise rapidly in response to these incentives. Exports of cotton yarn and textiles did increase considerably from 1967 to 1969, before the present incentives were introduced, but still were quite small in relation to the domestic offtake.

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[8] See FAO, "Per Caput Fibre Consumption, 1964-67", and similar earlier publications.

[9] *Textile Organon*, June 1970.

Textile exports from Turkey may benefit considerably in the years ahead from Turkey's accession to the European Community. On July 22, 1970, Turkey and the EC decided that the preparatory stage of Turkey's association with the Community was over and that Turkey would now enter a transitional period leading to full EC membership in 22 years.

Under terms of the agreement, 32 of 35 textile export items will enjoy full liberalization, but three others–cotton yarn, gray goods, and machine-woven carpets–will have quotas, to be reduced to zero in 12 years along with a 75-percent tariff reduction. Until the new agreement is ratified by the Turkish Parliament, which is expected in 1971, cotton manufactures exported to the EC are under quotas but still benefit from a 50-percent reduction in EC tariff rates.

Turkey's exports of cotton textiles to the United States in the fiscal year ending June 30, 1970, were subject to a quota of 3.5 million square yards, but only 444,000 square yards were actually imported. The quota for the year ending June 30, 1971, is 3.7 million square yards.

APPENDIX

Table 1.–Trends in Turkish crop acreages; fruit, nut, and olive tree numbers; and livestock numbers[1]

Crops	1960	1965	1968	1969	1970	Indices				
						1960	1965	1968	1969	1970
Acreages:	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*			*1960 = 100*		
Cotton	1,534	1,693	1,762	1,579	1,354	100	110	115	103	88
Wheat	19,027	19,521	20,015	20,509	20,015	100	103	105	108	105
Other grains	12,960	12,503	12,187	12,108	12,066	100	96	94	93	93
Oilseeds except cotton	791	746	937	1,033	1,124	100	94	118	131	142
Pulses	860	833	825	850	857	100	97	96	99	100
Vegetables	556	507	529	568	583	100	91	95	102	105
Tobacco	469	549	680	778	652	100	117	145	166	139
Sugarbeets	502	390	314	255	306	100	78	63	51	61
All annual crops	36,284	36,099	37,315	37,747	37,028	100	99	103	104	102
Grapes	1,871	1,977	2,095	2,071	2,088	100	106	112	111	112
Numbers:	*Million trees*[2]	*Million trees*[2]	*Million trees*[2]	*Million trees*[2]	*Million trees*[2]					
Olives	54.8	64.3	72.3	73.0	74.0	100	117	132	133	135
Citrus	8.2	11.5	12.4	12.4	12.6	100	140	151	151	154
Deciduous fruits	62.4	70.3	77.3	79.4	81.2	100	113	124	127	130
Nuts	177.2	206.0	221.5	219.6	223.3	100	116	125	124	126
	Millions	*Millions*	*Millions*	*Millions*	*Millions*					
Livestock	76.1	72.1	75.7	74.4	74.7	100	95	99	98	98

[1] In 1967, Turkey's total area was 193.0 million acres, of which 64.5 million was in meadows and pastures; 5.9 million in vineyards and orchards; 38.3 million in annual planted crops; 20.5 million in fallow; 31.3 million in forests and 32.6 million acres in wasteland, lakes, and marshes.

[2] In 1968, 2.3 million acres were occupied by fruit trees and 1.8 million by olive groves.

Source: *Statistical Yearbook of Turkey, 1968, Summary of Agricultural Statistics, Turkey, 1968,* and FAS reports.

Table 2.–The climate of Turkey's principal cotton growing areas

Month	Adana				Antalya				Izmir			
	Average daily maximum	Average daily minimum	Days with frost	Precipitation	Average daily maximum	Average daily minimum	Days with frost	Precipitation	Average daily maximum	Average daily minimum	Days with frost	Precipitation
	°F	*°F*	*Number*	*Inches*	*°F*	*°F*	*Number*	*Inches*	*°F*	*°F*	*Number*	*Inches*
January	57	39	3.5	4.3	59	43	1.0	10.2	55	39	3.0	4.4
February	59	41	1.8	4.0	60	44	.5	6.9	57	40	2.7	3.3
March	66	45	.8	2.5	64	46	.1	3.1	63	43	1.0	3.0
April	74	51	–	1.6	70	52	–	1.5	70	49	–	1.7
May	83	59	–	2.0	78	60	–	1.3	79	56	–	1.3
June	89	66	–	0.7	86	67	–	0.5	87	63	–	.6
July	93	71	–	0.2	93	73	–	0.1	92	69	–	.2
August	94	72	–	0.2	92	72	–	0.1	92	69	–	.2
September	91	66	–	0.7	87	67	–	0.6	85	62	–	.8
October	84	58	–	1.9	80	59	–	2.1	76	55	–	2.1
November	73	51	.1	2.4	71	52	–	4.7	67	49	.2	3.3
December	61	43	1.5	3.8	62	46	.2	10.5	58	42	1.4	4.8
Annual	77	55	7.8	24.3	75	57	1.8	41.7	73	53	8.2	25.5

Compiled from *Statistical Yearbook of Turkey, 1968,* and *Tables of Temperature,* Relative Humidity and Precipitation for World published by Meteorological Office of Great Britain.

Table 3.–Costs in detail and returns from producing cotton in Turkey[1]

Item	Aegean region			Cukurova region									
	Irrigated			Irrigated					Nonirrigated				
	Denizli[2]		Average[3]	Seyhan project[4]		Average[3]			Average[3]	Hilly land[3]		Bottomland[3]	
	1967	1968	1968	1967	1968	1968	1969	1970	1968	1969	1970	1969	1970
	Pounds per acre	*Pounds per acre*	*Pounds per acre*	*Pounds per acre*	*Pounds per acre*	*Pounds per acre*	*Pounds per acre*	*Pounds per acre*	*Pounds per acre*	*Pounds per acre*	*Pounds per acre*	*Pounds per acre*	*Pounds per acre*
Yield per acre:													
Seed cotton	1737	1566	1784	1963	2498	1517	1784	1695	535	446	446	580	625
Lint	668	602	686	755	961	583	686	652	206	171	171	223	240
Cottonseed	1069	964	1098	1208	1537	934	1098	1043	329	275	275	357	385
Gross income per acre:	*Dollars per acre*	*Dollars per acre*	*Dollars per acre*	*Dollars per acre*	*Dollars per acre*	*Dollars per acre*	*Dollars per acre*	*Dollars per acre*	*Dollars per acre*	*Dollars per acre*	*Dollars per acre*	*Dollars per acre*	*Dollars per acre*
Gross income from seed cotton	192.18	163.18	[5] 213.13	227.52	260.80	[6] 169.52	[7] 202.34	[8] 179.41	[7] 59.80	[7] 50.59	[7] 47.21	[7] 65.65	[7] 66.10
Gross income from cotton seed[9]	40.56	29.72	33.86	45.86	47.39	28.82	39.84	33.25	10.16	9.98	8.84	12.95	12.31
Less costs per acre:													
Land preparation, seeding, tilling	(10)	(10)	32.60	13.67	16.05	14.16	13.04	9.78	13.49	10.57	9.44	11.24	9.61
Seed	5.85	4.95					2.61	1.96		1.57	1.96	2.07	1.96
Fertilizing	(10)	(10)	23.38	23.97	21.49	20.23	.90	.67	–	–	–	–	–
Fertilizer	15.60	16.23					22.48	13.49	–	–	–	–	–
Weed control	(10)	(10)	22.48	15.29	22.03	20.23	18.86	21.92	11.24	9.44	12.48	12.59	15.85
Insect control	(10)	(10)	4.50	20.32	22.75	15.74	8.99	8.43	6.74	.90	.67	2.70	.67
Chemicals	3.15	3.37					26.98	20.23		2.25	1.69	8.99	6.74
Irrigating	(10)	(10)	18.86	9.58	11.83	13.49	6.74	5.73	–	–	–	–	–
Water	2.83	3.78					10.34	7.76	–	–	–	–	–
Picking	(10)	(10)	26.98	29.59	34.62	22.48	30.58	22.43	8.99	7.64	5.90	9.94	8.26
Interest	7.60	6.74	12.82	15.55	17.55	10.58	–	11.87	4.42	No data	3.37	No data	4.59
Family labor	10.07	4.23	Included in items listed above										
Hired labor	37.14	39.66											
Machinery and tools	32.55	21.40											
Animal power	1.44	2.83											
Miscellaneous	–	.27	–	–	–	–	4.95	6.34	–	2.70	1.96	3.60	2.53
Total costs	116.23	103.46	141.64	127.97	146.32	116.91	146.50	130.61	44.88	35.07	37.47	51.13	50.21
Net income per acre:													
Net income before rent	75.95	59.72	71.49	99.55	114.48	52.61	55.84	48.80	14.92	15.52	9.74	14.52	15.89
Rent	–	–	56.21	42.99	46.58	44.96	(11)	(11)	22.48	(11)	(11)	(11)	(11)
Per pound of lint basis (adjusted for value of cottonseed):[9]	*Cents per lb.*	*Cents per lb.*	*Cents per lb.*	*Cents per lb.*	*Cents per lb.*	*Cents per lb.*	*Cents per lb.*	*Cents per lb.*	*Cents per lb.*	*Cents per lb.*	*Cents per lb.*	*Cents per lb.*	*Cents per lb.*
Gross income	22.7	22.2	26.1	24.1	22.2	24.1	23.7	22.4	24.1	23.7	22.4	23.6	22.4
Costs	11.3	12.2	15.7	10.9	10.3	15.1	15.5	14.9	16.9	14.7	16.7	17.1	15.8
Net return before rent	11.4	10.0	10.4	13.2	11.9	9.0	8.2	7.5	7.2	9.0	5.7	6.5	6.6
Rent	(11)	(11)	8.1	5.5	5.0	7.6	(11)	(11)	10.6	(11)	(11)	(11)	(11)

[1] Converted from Turkish lira at 9.00 lira to the dollar for 1967-69 and at 12.00 lira to the dollar for 1970. Actually, the exchange rate was changed in August 1970, so costs in 1970 were largely incurred when the old rate was in force, while the cotton was sold when the new rate was in force. [2] From Denizli Ilinde Pamuk, Meksika Bradayi, Cesitleri ve Akbasak Bugdayinin Mukayeseli Economik Analizi 1967-68. T. C. Taram Bakanligi, Ankara, 1969. [3] Based on questionnaires sent out by Cotton Department, Government of Turkey. [4] Seyhan Irrigation Project Extension Service, Summary Report, 1969, Activities, January 1969, pps. 40-43. [5] Estimated on basis of average price of 11.9 cents per pound for seed cotton at Manisa *(Turkish Monthly Bulletin of Statistics)*. [6] Estimated on basis of price of 11.2 cents per pound for seed cotton as on Seyhan Project. See reference[4]. [7] Basis of 8.5 cents per pound for seed cotton. Price from personal notes. [8] Basis of 10.6 cents per pound for seed cotton. Price from personal notes. [9] Based on average prices for cottonseed as reported in *Turkish Monthly Bulletin of Statistics:* In 1967, 2.3 cents per pound; 1968, 3.1 cents; 1969, 3.6 cents; and 1970, 3.2 cents. [9] Not including cost of ginning 1.9-2.3 cents per pound of lint. [10] Included under labor, machinery and tools, and animal power.
[11] Not available.

Table 4.–Comparative costs of production for cotton and Mexican and native wheat (073-44), Denizli Province[1]

Item	All farms in study					One-third of farms with highest yield				
	Cotton			Wheat–1968		Cotton			Wheat–1968	
	1967	1968	Average	Mexican	Native 073-44	1967	1968	Average	Mexican	Native 073-44
	Dol. per acre	*Dol. per acre*	*Dol. per acre*	*Dol. per acre*	*Dol. per acre*	*Dol. per acre*	*Dol. per acre*	*Dol. per acre*	*Dol. per acre*	*Dol. per acre*
Labor:										
Family	10.09	4.24	7.17	1.44	1.05	12.28	5.22	8.75	1.84	0.98
Hired	37.12	39.65	38.39	3.06	2.13	44.26	52.69	48.47	2.42	1.73
Total	47.21	43.89	45.56	4.50	3.18	56.54	57.91	57.22	4.26	2.71
Seed	5.85	4.94	5.40	7.42	6.84	5.08	4.90	4.99	7.43	7.21
Fertilizer	15.62	16.23	15.92	15.05	4.73	22.16	19.19	20.68	17.51	6.36
Manure	–	.27	.13	.16	.35	–	–	–	.11	.03
Pest control	3.17	3.38	3.27	.10	.01	4.84	3.26	4.05	–	.01
Water	2.81	3.76	3.29	1.46	.35	4.32	4.15	4.23	2.17	.15
Total	27.45	28.58	28.01	24.19	12.28	36.40	31.50	33.95	27.22	13.76
Power and equipment:										
Tractors	32.07	20.95	26.51	18.14	10.25	35.17	25.17	30.17	23.00	12.86
Animals	1.45	2.85	2.15	.80	2.99	1.40	1.96	1.68	.02	1.01
Small tools	.49	.48	.48	.06	–	.37	.37	.37	.11	–
Total	34.01	24.28	29.14	19.00	13.24	36.94	27.50	32.22	23.13	13.87
Interest	7.58	6.76	7.17	3.35	1.98	9.13	8.18	8.66	3.90	2.12
Total cost of production excluding cost of land	116.25	103.51	109.88	51.04	30.68	139.01	125.09	132.05	58.51	32.46

[1] Converted at 9.00 Turkish lira per dollar.

Source: Denizli Ilinde Pamuk, Meksika Bugdayi Cesitleri Ve Akbasak Bugdayinin Mukayeseli Ekonomik Analizi, 1967-68; Ankara Nisan - 1969.

Table 5.–Number of cotton gins in Turkey, 1968

Area and region	Roller gins		Saw gin		Presses
	Gins	Stands	Gins	Stands	
Cukurova:	*Number*	*Number*	*Number*	*Number*	*Number*
Adana	110	2,510	19	67	99
Icel	25	652	5	9	24
Hatay	51	467	2	5	22
Maras	12	95	–	–	8
Total	198	3,724	26	81	153
Aegean					
Aydin	104	1,451	3	13	57
Balikesir	29	255	–	–	16
Canakkale	28	76	–	–	16
Denizli	22	306	–	–	14
Izmir	61	1,110	1	2	58
Manisa	99	959	1	2	50
Mugla	26	239	1	2	12
Total	369	4,396	6	19	223
Antalya	7	24	2	3	17
Other areas	68	260	–	–	13
Total	642	8,404	34	103	406

Turkiye' de Pamuk Ekonomisi, by Nurettin Madran, Bulletin No. 9, Ankara, Turkey, 1967, p. 44, and unpublished data by Authors.

Table 6.–Wholesale prices of cotton, cottonseed, and cottonseed oilcake in Turkey[1]

Calendar year	Unginned cotton		Ginned cotton					Cotton-seed, Adana Standard	Cottonseed, oilcake	
			Cukurova, White			Izmir Standard White	Elazig Standard White			
	Denizli	Manisa	Adana		Mersin				Adana	Izmir
			Standard I	Standard II	Standard I					
	Cents per lb.	*Cents per lb.*	*Cents per lb.*	*Cents per lb.*	*Cents per lb.*	*Cents per lb.*	*Cents per lb.*	*Cents per lb.*	*Cents per lb.*	*Cents per lb.*
1962	11.1	11.9	29.6	24.0	27.0	28.1	24.3	3.1	3.1	3.1
1963	11.0	11.5	24.6	23.9	24.7	26.6	24.8	3.5	3.5	3.3
1964	11.1	11.2	24.0	23.6	24.1	28.1	24.0	2.8	3.5	3.4
1965	10.6	11.3	23.9	23.1	23.0	26.1	22.7	3.2	3.4	3.4
1966	9.9	11.1	23.1	21.9	23.0	25.4	23.2	3.9	3.7	3.1
1967	10.2	12.2	25.5	24.7	25.3	27.6	25.2	3.8	3.6	3.7
1968	10.5	11.9	24.9	22.0	26.9	28.2	25.3	3.1	3.3	3.5
1969	10.6	11.9	23.2	21.9	23.0	26.1	24.7	3.5	3.3	3.5
1969:										
June	–	–	23.8	23.4	–	28.0	24.4	3.4	–	–
July	–	–	24.5	23.7	–	27.8	24.8	3.4	–	–
August	–	–	24.5	24.1	–	28.1	24.7	–	3.0	–
September	–	11.7	23.3	22.4	23.1	26.5	25.3	3.2	–	–
October	11.1	11.8	22.7	21.3	22.9	26.2	24.8	3.4	3.3	–
November	10.5	12.1	23.0	21.9	23.2	26.1	24.4	3.7	3.5	3.5
December	10.5	12.1	24.7	23.5	24.8	26.9	24.6	4.1	–	–
1970:										
January	11.3	11.8	25.0	24.1	–	26.8	24.7	4.1	3.9	–
February	–	12.4	25.0	23.5	24.8	26.8	25.5	3.8	3.9	3.9
March	–	12.4	25.4	23.7	25.9	27.1	26.9	3.8	–	–
April	–	–	27.8	26.4	27.1	28.7	27.6	4.0	–	4.0
May	–	–	28.0	27.5	–	28.8	28.4	–	–	–
June	–	13.1	27.8	27.3	–	28.8	30.4	4.0	3.5	–
July	–	–	28.0	25.9	–	29.1	32.3	–	–	–
August	8.3	10.6	22.3	–	–	22.7	21.8	3.2	–	–
September	–	–	–	–	–	[2] 25.2	–	–	–	–
October	–	–	–	–	–	[2] 25.3	–	–	–	–
November	–	–	–	–	–	[2] 26.5	–	–	–	–
December	–	–	–	–	–	[2] 27.4	–	–	–	–
1971										
January	–	–	–	–	–	[2] 28.2	–	–	–	–

[1] Converted at 9.00 lira to the dollar prior to August 1970; 12.00 lira thereafter.
[2] Preliminary.

Source: *Monthly Bulletin of Statistics of Turkey.*

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